

Projector Test

It appears to be working!



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Prelude...





Americans care about the environment.





For many citizens, species and habitat conservation are perceived as issues occurring somewhere else.





With exceptions, many do not necessarily view conservation as an issue that need to be addressed in our own backyard.





"How Special We Are"

Creating a Tool for Outreach



"How Special We Are"

What we wanted to do:

- Tell an interesting story
- Use respected sources of information
- **Minimize emphasis on the ESA**
- **Avoid regulatory language**
- Create opportunities with others



"How Special We Are"

What we needed:

- Science-based knowledge
- Robust and interesting message
- Flexible presentation options
- Scalable application
- Utility for other programs



"How Special We Are"

What we designed were modules:

- Ecosystems and habitats
- Biodiversity
- Extinction
- Status of species
- Threats
- Opportunities/Segue
- "Extended value"



"How Special We Are"

- American Zoo and Aquarium Association
- National Cattlemen's Beef Association
- National Geographic Society
- National Conservation Training Center
- FWS External Affairs
- U.S. Department of Defense
- Wildlife Habitat Council
- FWS Endangered Species Program
- NatureServe



What is the U.S. Fish and Wildlife Service? We are the people who...



“Work with you and others to conserve, protect, and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American People.”

With that said...

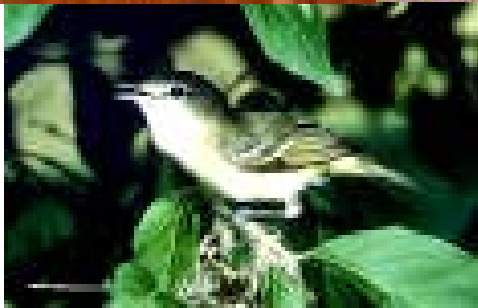




The story so far...



"How Special We Are"



Preserving the Heritage





Ecosystems and Habitats





We live in a very
special place.





The territorial extent of the United States covers nearly one third of the northern hemisphere.

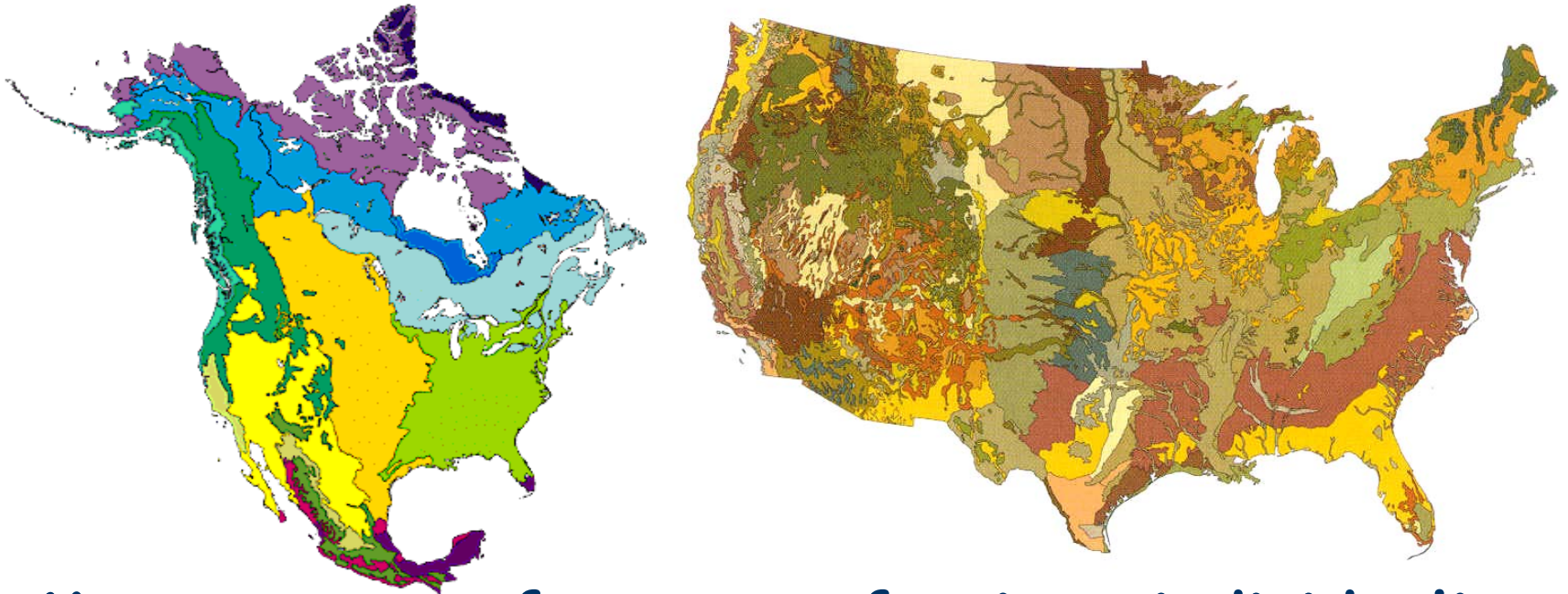




We are stewards of global treasures.

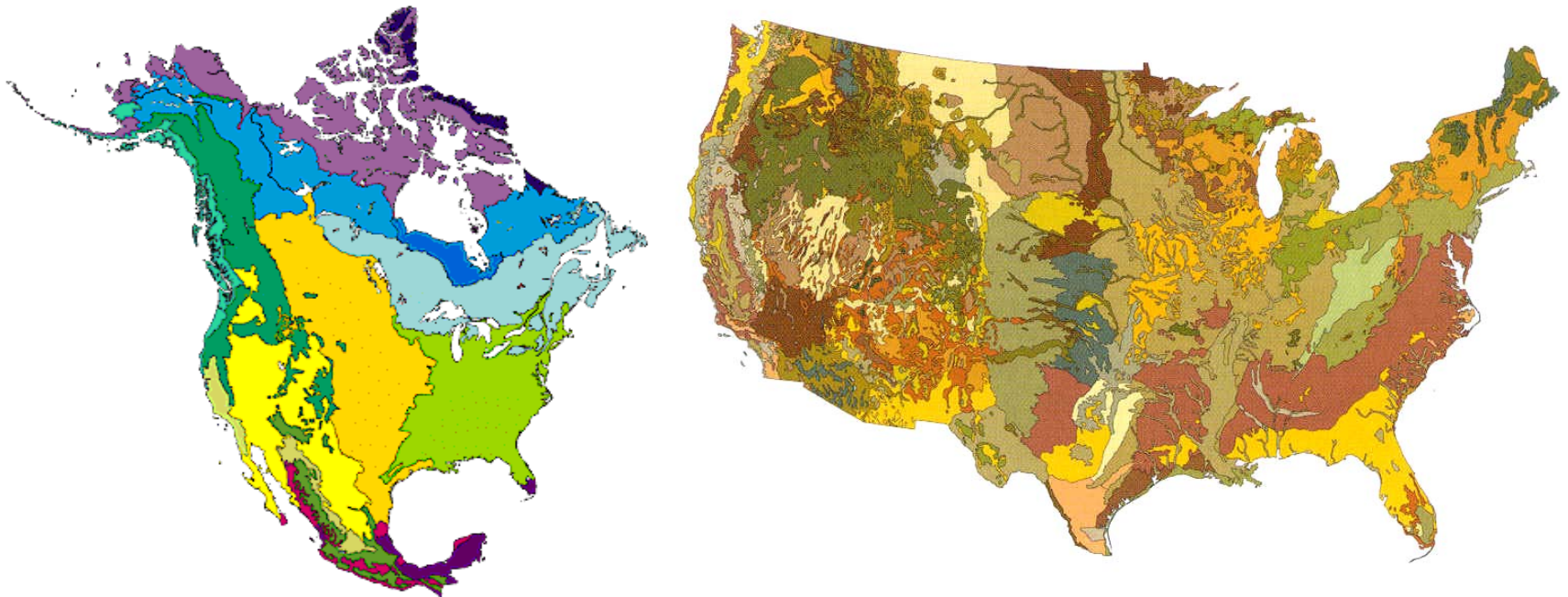


The United States has more ecosystems and habitat types than any other nation.



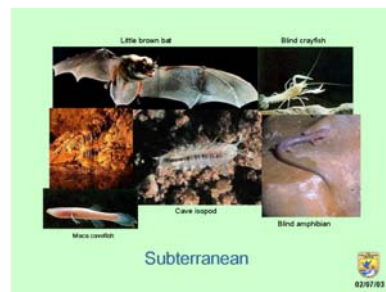
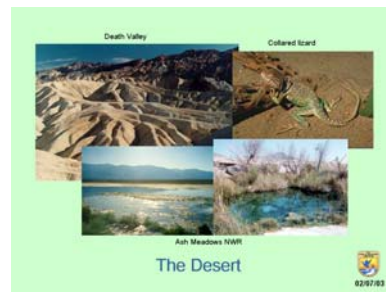
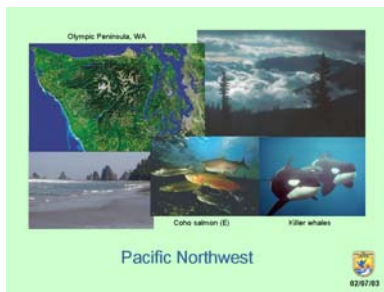
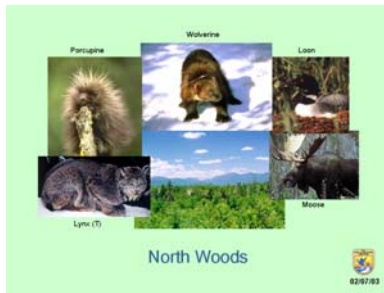
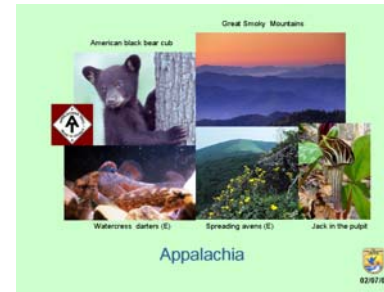
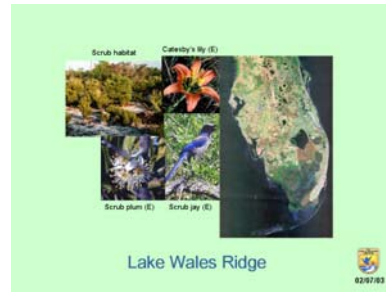
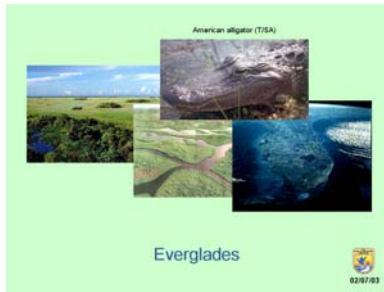
Many possess features of unique individuality and worldwide significance.





They also support communities and species of plants and animals found nowhere else on earth.

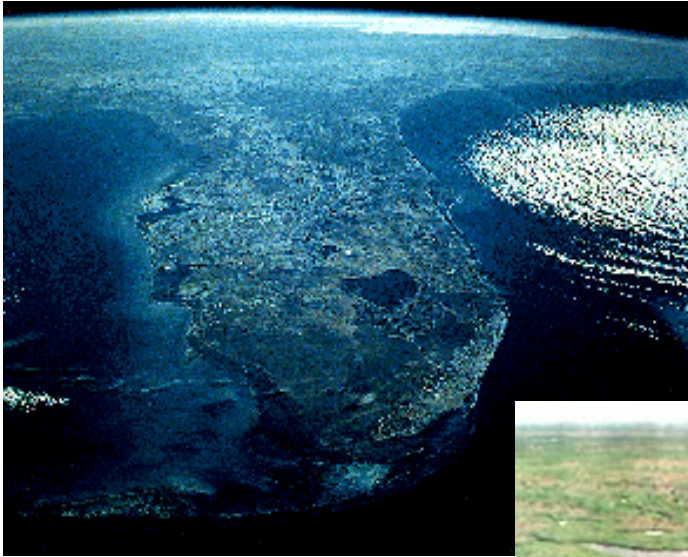




Ecosystem examples



American alligator (T/SA)



Florida peninsula

Coastal prairie/mangroves



Hardwood hammocks

Everglades



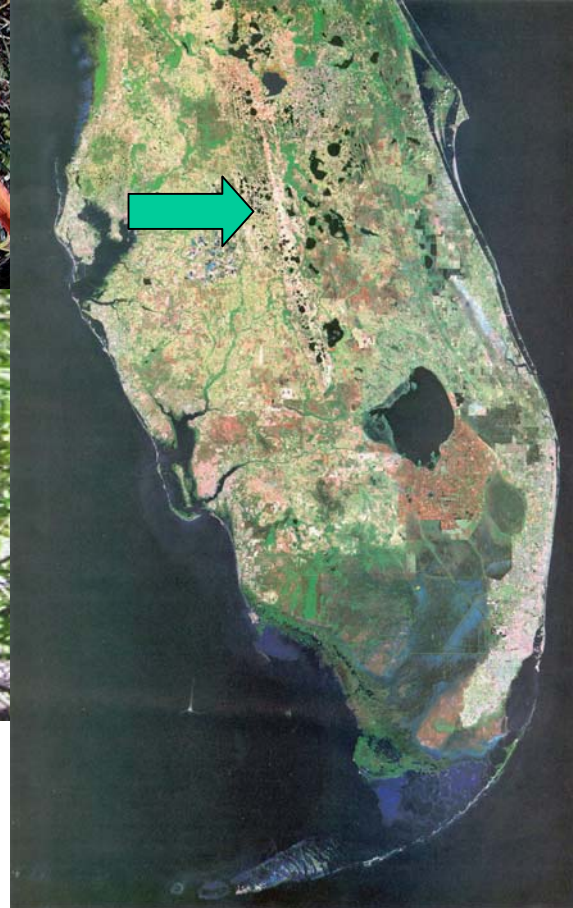
Scrub habitat



Catesby's lily (E)



Lake Wales Ridge



Scrub plum (E)



Florida scrub jay (E)

Lake Wales Ridge



Great Smoky Mountains

American black bear cub



Watercress darters (E)



Spreading avens (E)



Jack in the pulpit

Appalachia





Appalachia



Blue crab



The "Bay"



Spartina marsh

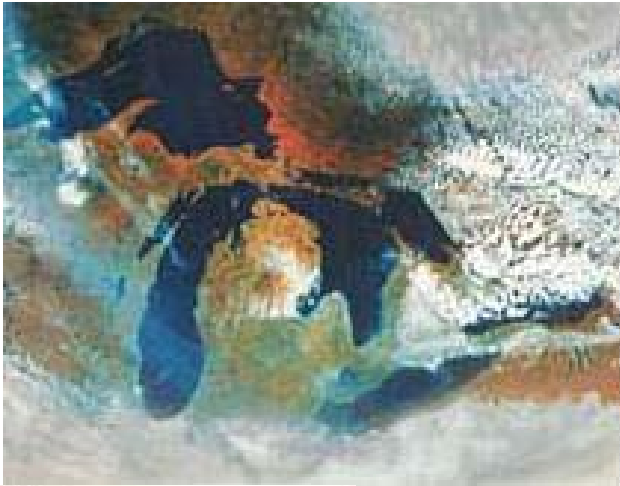


American oyster

Chesapeake Bay



Lake Superior shoreline



Blue pike (Ex)



20% of the world's available fresh water. Coaster brook trout

Great Lakes





Bison



Black-footed ferret (E)



Bluestem



**Black-tailed
prairie dog**

Great Plains





Mountain lion



Spring wildflowers



Grizzly bear (E)



Mountain goat

The Continental Divide



Olympic Peninsula, WA

Temperate rainforest ecosystem



Pacific coastline

Coho salmon (E)

Orcas

The Pacific Northwest



Death Valley



Collared lizard

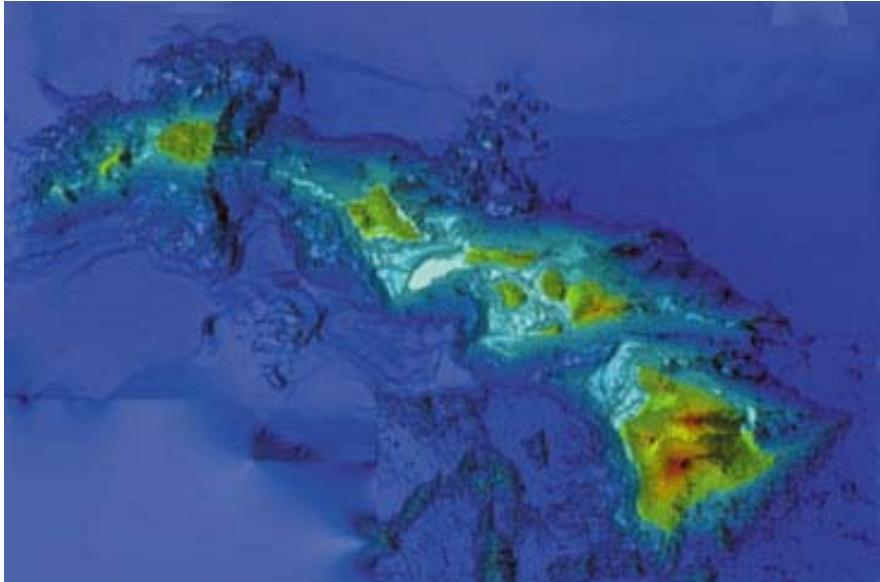


Ash Meadows NWR

The Desert



Hawaiian Islands



Hawaiian Islands



El Yunque National Forest, Puerto Rico

The Tropics



Polar bears



Spectacled eider (T)



Caribou



Bowhead whale (E)



Arctic fox

The Arctic



"Polar Bear's Habitat Threatened By Thinning Of Arctic Sea Ice"

The screenshot shows a Netscape browser window with the address bar displaying <http://www.sciencedaily.com/releases/2003/10/031030062244.htm>. The page features the ScienceDaily logo and a navigation bar with links to Latest News, Browse Topics, Encyclopedia, and Science Shop. A search bar is present with the text "Search articles with: keyword(s) in all sections and sort results by: relevance or date". The article title is "Polar Bears' Habitat Threatened By Thinning Of Arctic Sea Ice" and the source is "University College London". The date is "2003-10-30". The article text states: "The main natural habitat of the polar bear is under increasing threat as a consequence of the dramatic thinning of the Arctic sea ice. The link between the thinning of the ice and rising temperatures has been discovered by scientists at UCL and the Met Office Hadley Centre for Climate Prediction and Research, whose findings are due to be published in the 30th October edition of Nature. The thinness of the ice covering the Arctic Ocean, approximately three metres deep, makes it far more vulnerable to longer summers than the glaciers of the Antarctic. A 40% thinning of the ice has occurred since the 1960s. Polar bears rely on the ice to hunt for seals, and its earlier break-up is giving them less time to hunt. Continued decrease in the Arctic's ice cover would also act to increase the effects of global warming in the northern hemisphere by decreasing the amount of sunlight reflected by the ice. It is also believed that the Arctic ice plays a role in the operation of the Gulf Stream, and that this could be disrupted by continued thinning. Previous studies suggesting that the decrease in ice cover was". A "What's Related" section lists: "Polar Bear Headed For Extinction, Says University Of Alberta Scientist", "New Study Shows Early Signals Of Climate Change In Earth's Cold Regions", and "Evidence Mounts For Arctic Oscillation's Impact On Northern Climate".

Source: University College, London

"Polar bears rely on the ice to hunt for seals, and its earlier break-up is giving them less time to hunt."



"Norway's Androgynous Polar Bears"

Climate change is
not their only
problem.



Source: Arctic Monitoring and Assessment Programme



"Toxic Threat to Inuit Food"



Source: Arctic Monitoring and Assessment Programme

"Greenlanders should consider changing their eating habits, to avoid possible health effects like reduced fertility, genetic damage and deformities in children."



Polar bears



Spectacled eider (T)



Caribou



Bowhead whale (E)



Arctic fox

The Arctic



"Cetacean Seniors... Whales That Give New Meaning to Longevity"



Source: Scripps Institution of Oceanography



Florida manatees (E)



Salt marsh



Staghorn coral



Arctic pack ice



Hydrothermal vents



French grunts

Marine Ecosystems



Little brown bat



Blind cavefish



Cave isopod



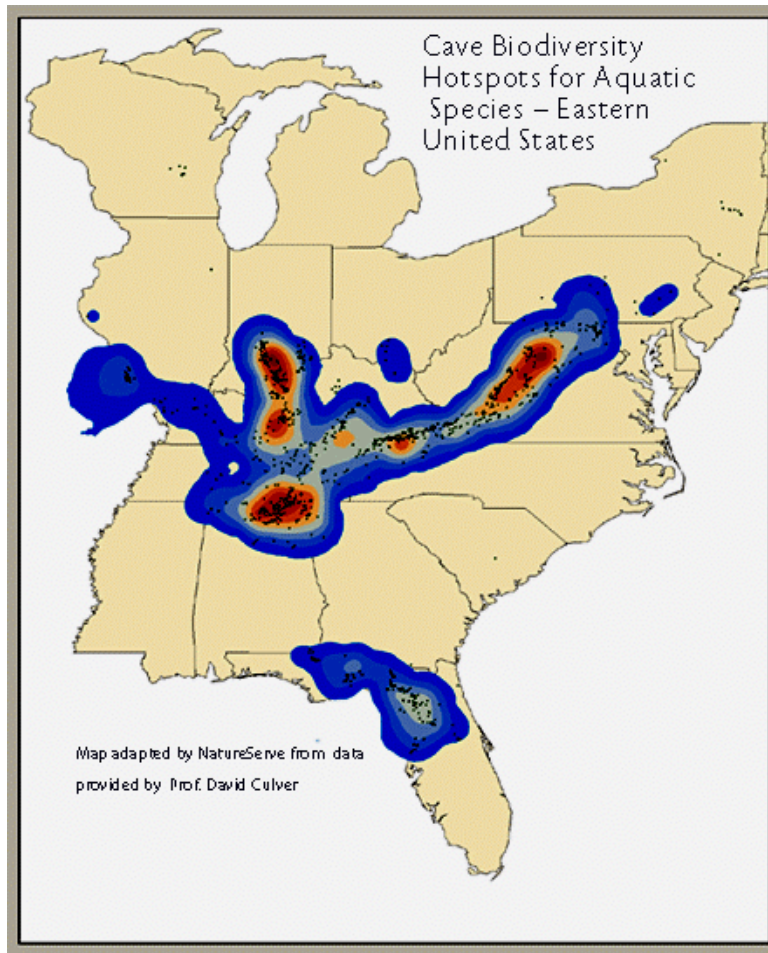
Blind amphibian



Maca cavefish

Subterranean Ecosystems

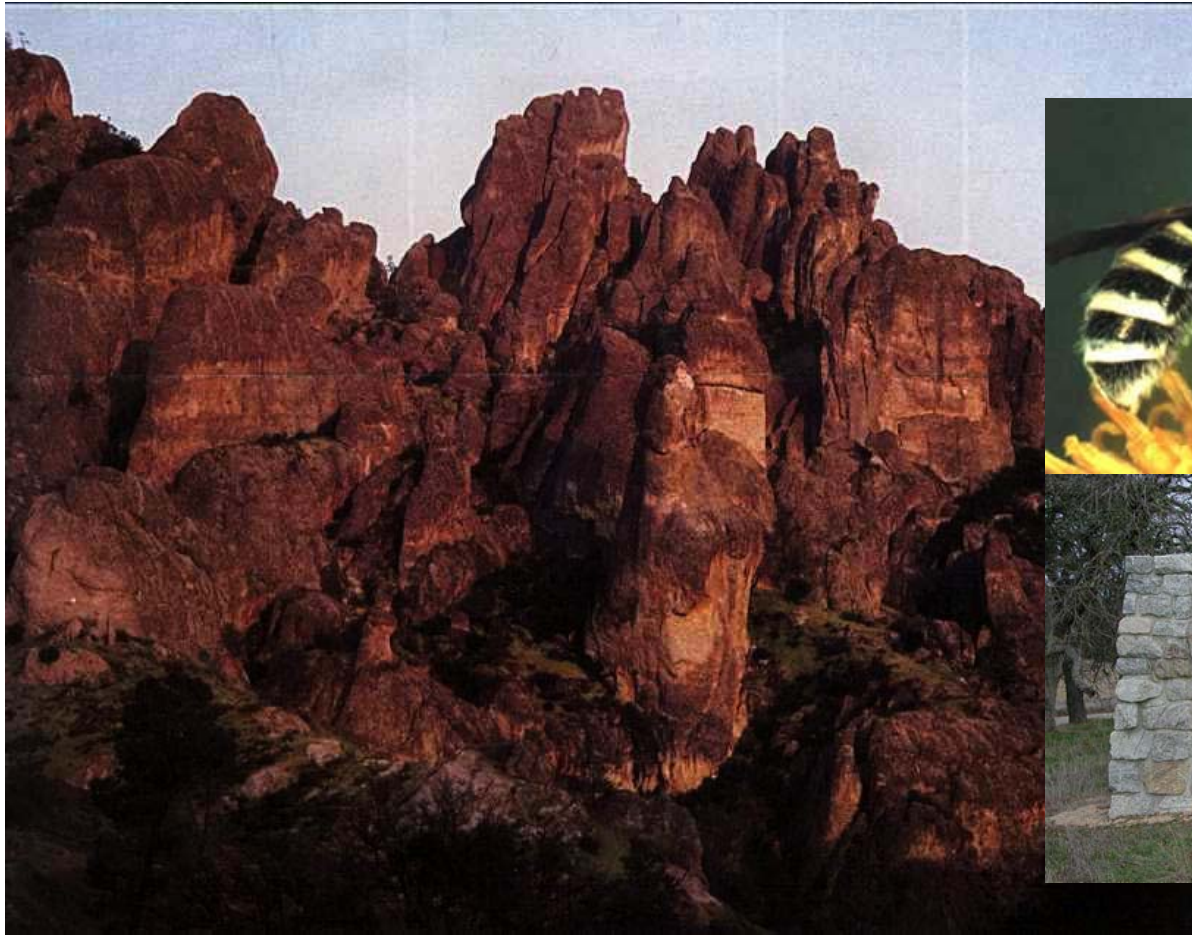




**Globally significant
hotspots of
biodiversity occur
within the United
States in
unexpected places.**

Special Communities: Cave Biodiversity





Special Communities: Pinnacles National Monument



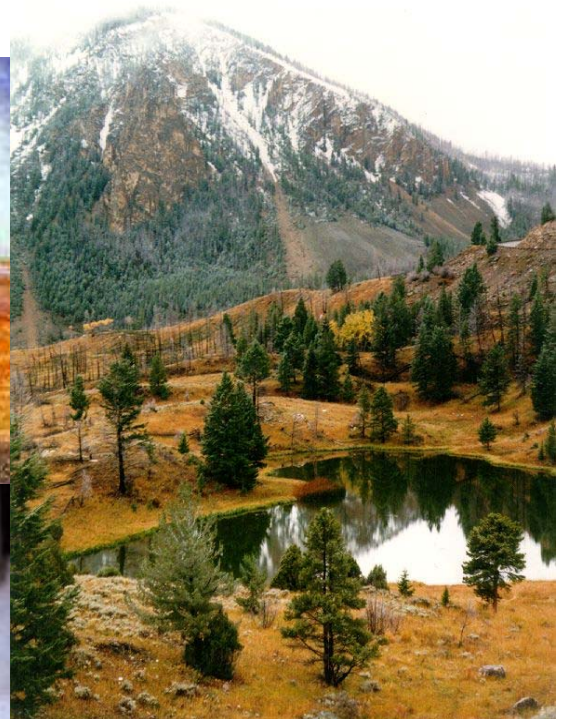


The world's largest geyser field.

Hot springs



Grey wolf (T)

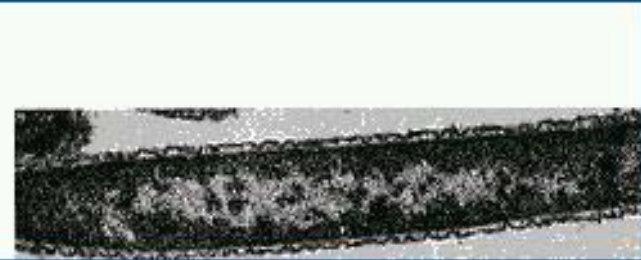


One of the largest remaining and relatively intact temperate ecosystems on earth.

Special Communities: Yellowstone

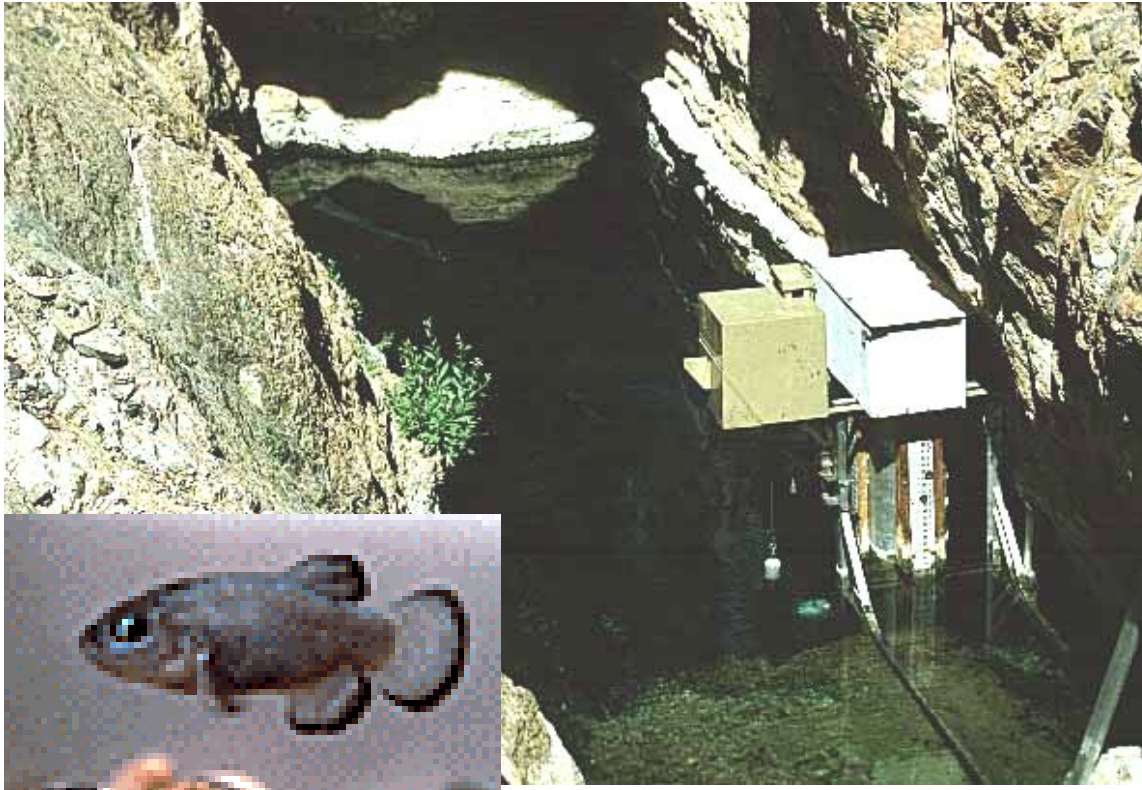


Thermus aquaticus



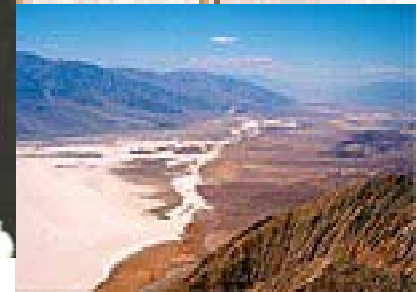
Special Communities: Yellowstone





Devils Hole pupfish (E)

The habitat



Special Communities: Death Valley





Biodiversity





We are “home” to more than ten percent of the 1.5 to 1.75 million species of plants and animals known to science.



What's so special?

We are particularly rich in the diversity of life within our Nation's waters.



The United States ranks first
in the world for diversity...

among temperate fishes,

salamanders,

freshwater turtles,
crayfish, mussels and,

aquatic insects such as
mayflies, caddisflies,
stoneflies and others.



And another group I
inadvertently overlooked.



Ambersnail

The United States is also home to more
freshwater snails than any other nation.



Or lands are also home to more than 20,000 species of plants, including these endangered green pitcher plants.

Green pitcher plant (E)



Armillaria ostoyae



Bristlecone
pine

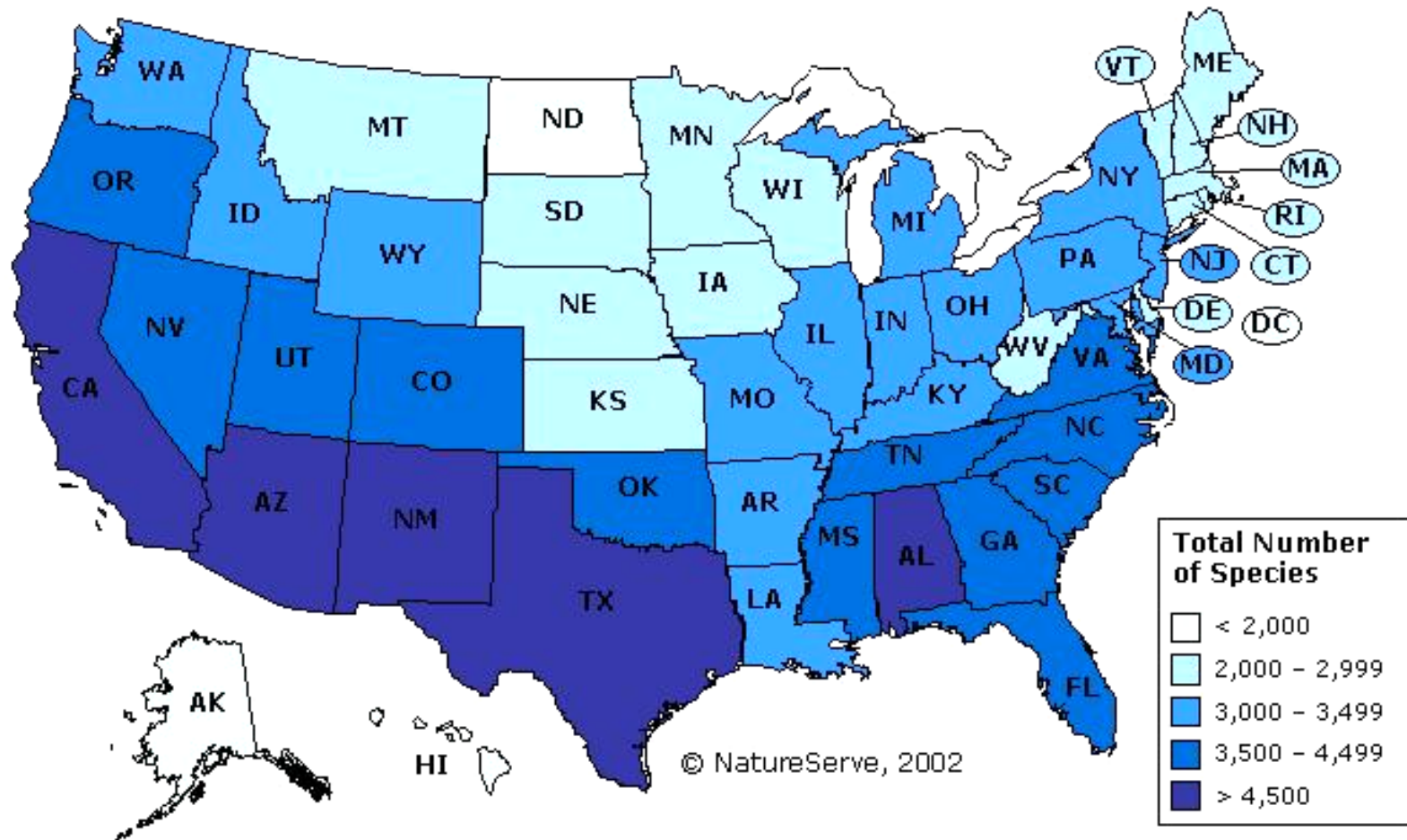


Redwoods



Some of the world's largest...
tallest...
and oldest species...
occur only in the United States.

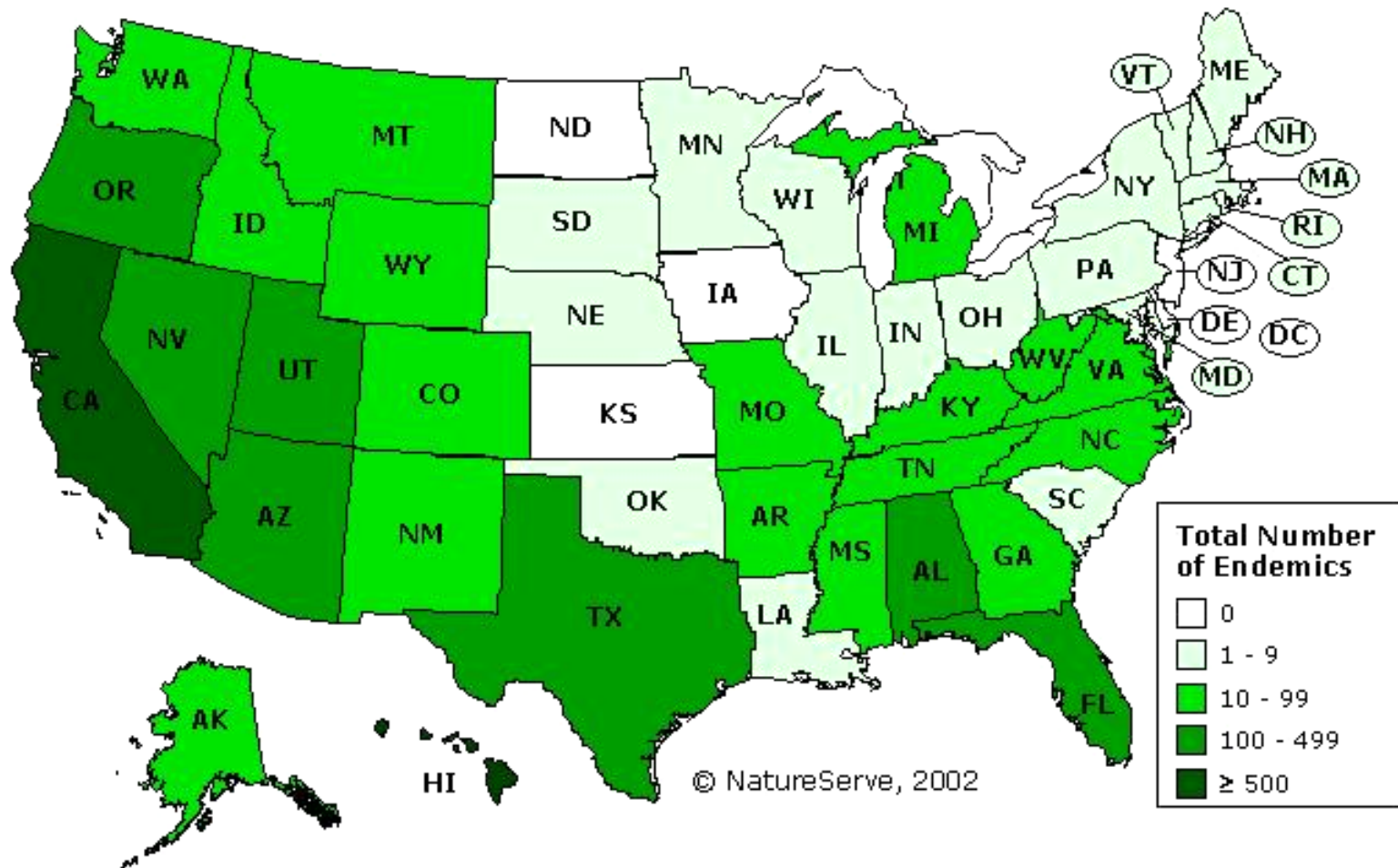
Species Diversity By State



Source: Bruce A. Stein. 2002. *States of the Union: Ranking America's Biodiversity*. Arlington, Virginia; NatureServe.



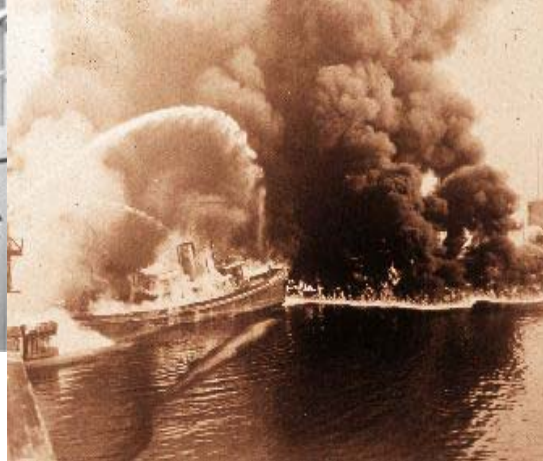
Species Endemicity by State



Source: Bruce A. Stein. 2002. *States of the Union: Ranking America's Biodiversity*. Arlington, Virginia; NatureServe.



Our Nation's natural resources have an incredible history.



Unfortunately, we have not always exercised proper care as stewards of our land, water and living resources.





Extinction



There is a record, in 1612, of a buffalo being killed on the shore of the Potomac River.



Farther west there were herds estimated to contain 40-60, perhaps as many as 80 million animals.

By the end of the 1800's fewer than 300 individuals remained.





"The primary cause of the buffalo's extermination ... was the descent of civilization, with all its elements of destructiveness, upon the whole of the country inhabited by that animal..."

William T. Hornaday, 1889



**"The passenger pigeon
needs no protection.**

Wonderfully prolific,
having the vast forests
of the North as its
breeding grounds,
traveling hundreds of
miles in search of food,
it is here today and
elsewhere tomorrow, and
no ordinary destruction
can lessen them, or be
missed from the myriads
that are yearly
produced."

Report of a select committee of the Ohio
Senate in 1857 on a bill proposed to protect the
Passenger Pigeon.



The Last Passenger Pigeon

Photograph by Enno Meyer, 1911





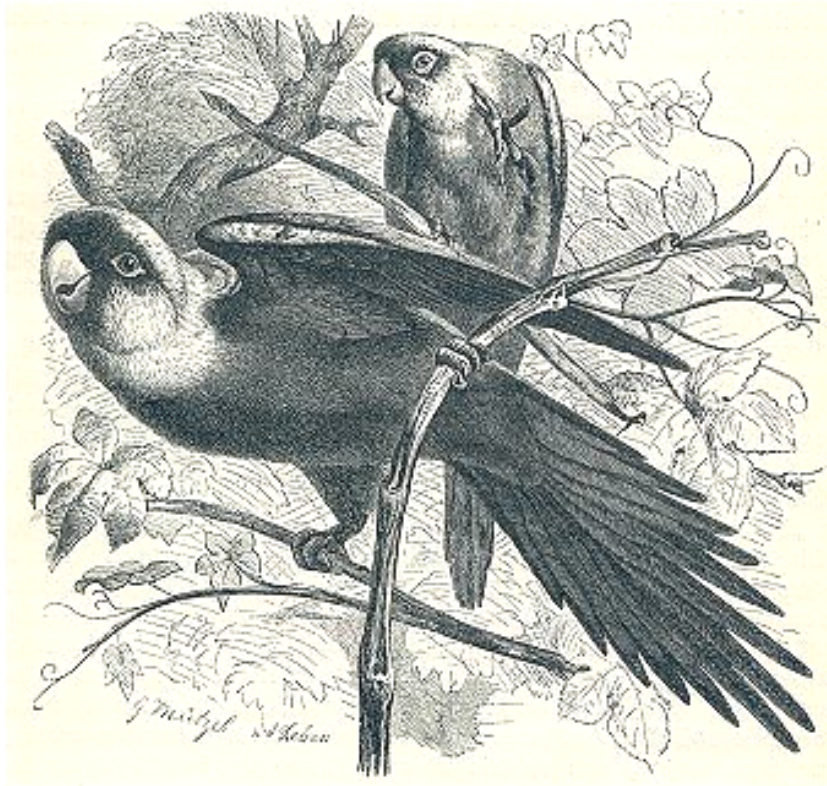
Martha's is just one of more than 500 native species that have gone extinct or are missing.

Just a little over two centuries ago the passenger pigeon was the most numerous species of bird on earth.

On September 1, 1914, the last passenger pigeon died.

Her name was "Martha."

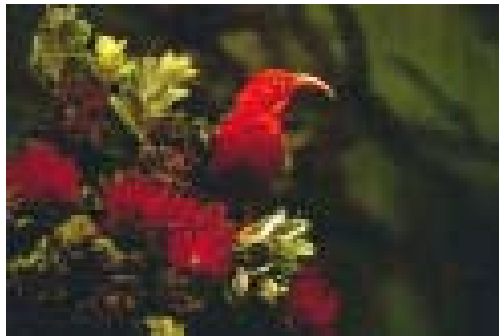




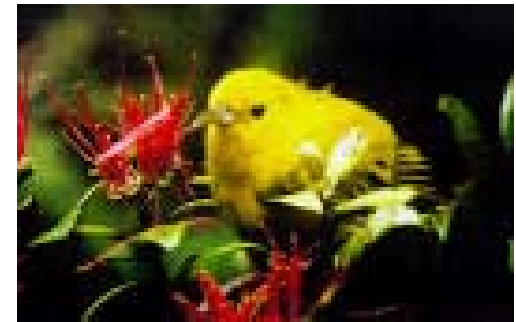
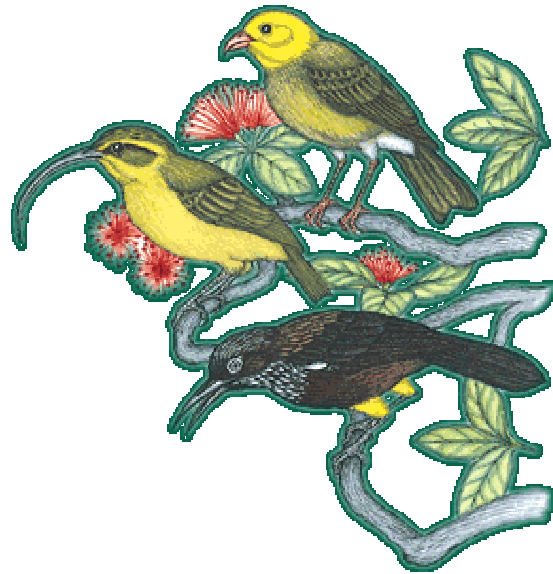
Carolina parakeet

Along with the passenger pigeon; the Carolina parakeet, ivory-billed woodpecker, heath hen, and the dusky seaside sparrow are extinct.





Hawaiian Honeycreeper



Hawaiian Finch

Of the 71 birds native to Hawaii, 26 have vanished.



Black Mamo (Ex)

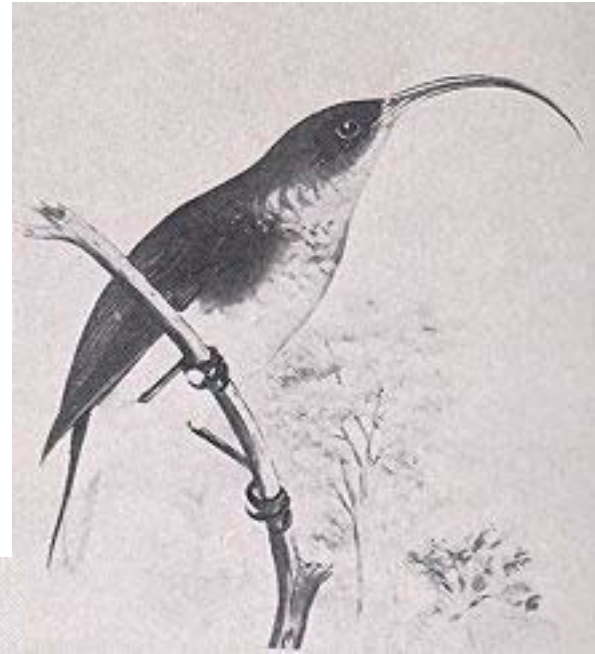


Hawaii Akialoa (Ex)

Extinction is Forever



Kipi (Ex)

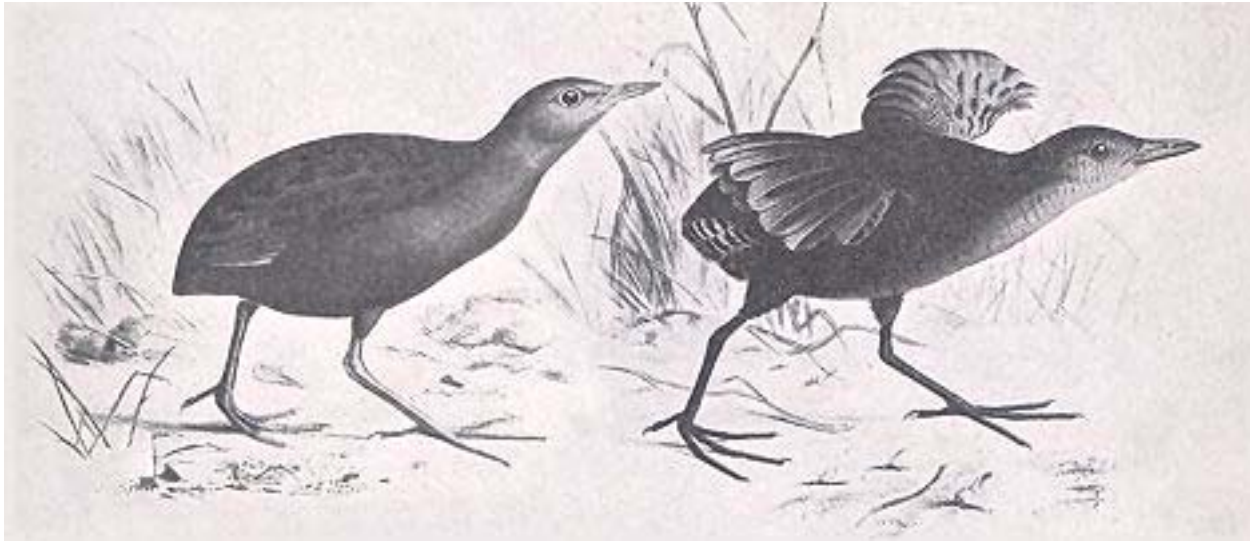


Kona Grosbeak (Ex)



Extinction is Forever



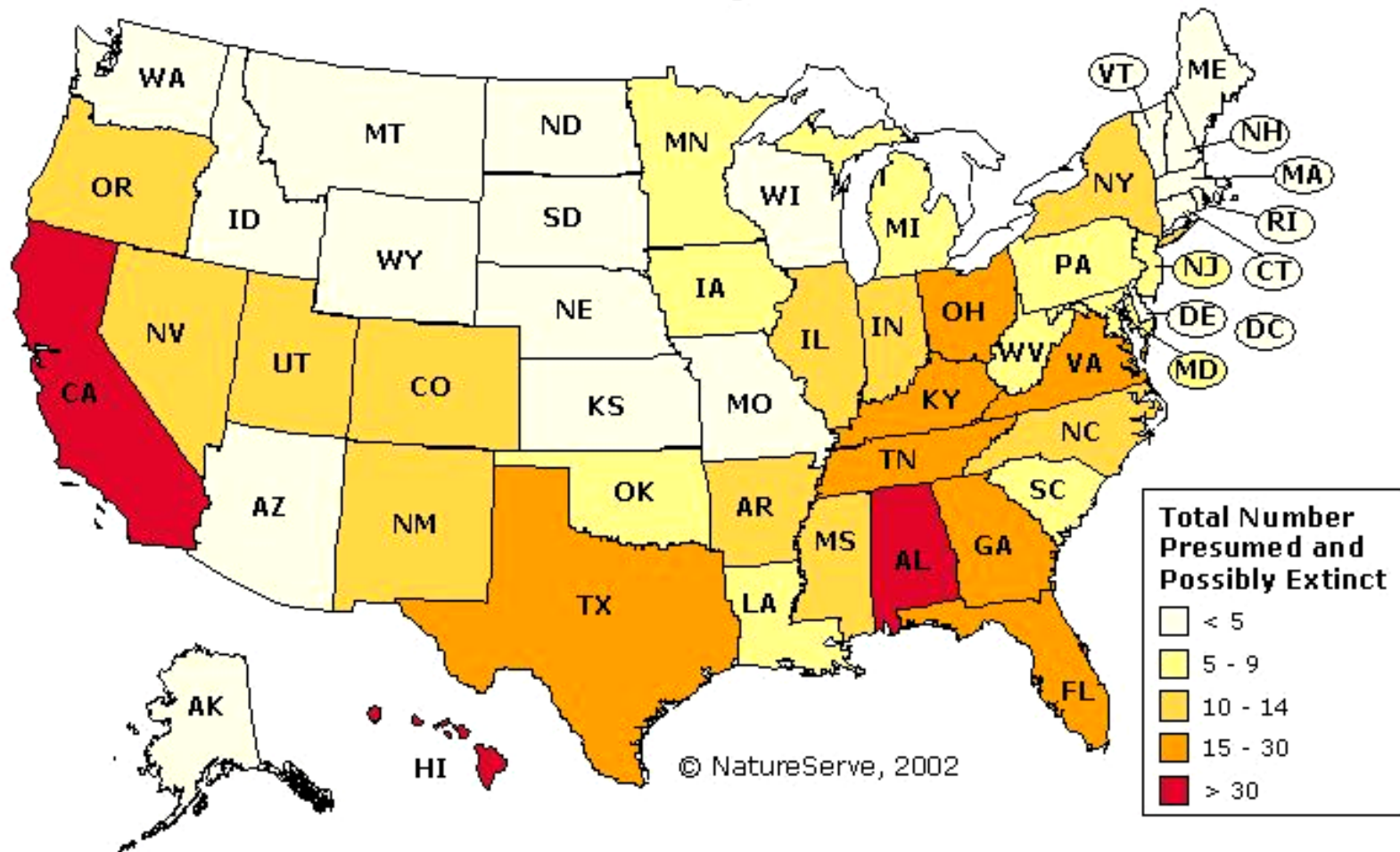


Hawaiian Rail (Ex)

Extinction is Forever



Species Extinctions by State



Source: Bruce A. Stein. 2002. *States of the Union: Ranking America's Biodiversity*. Arlington, Virginia; NatureServe.

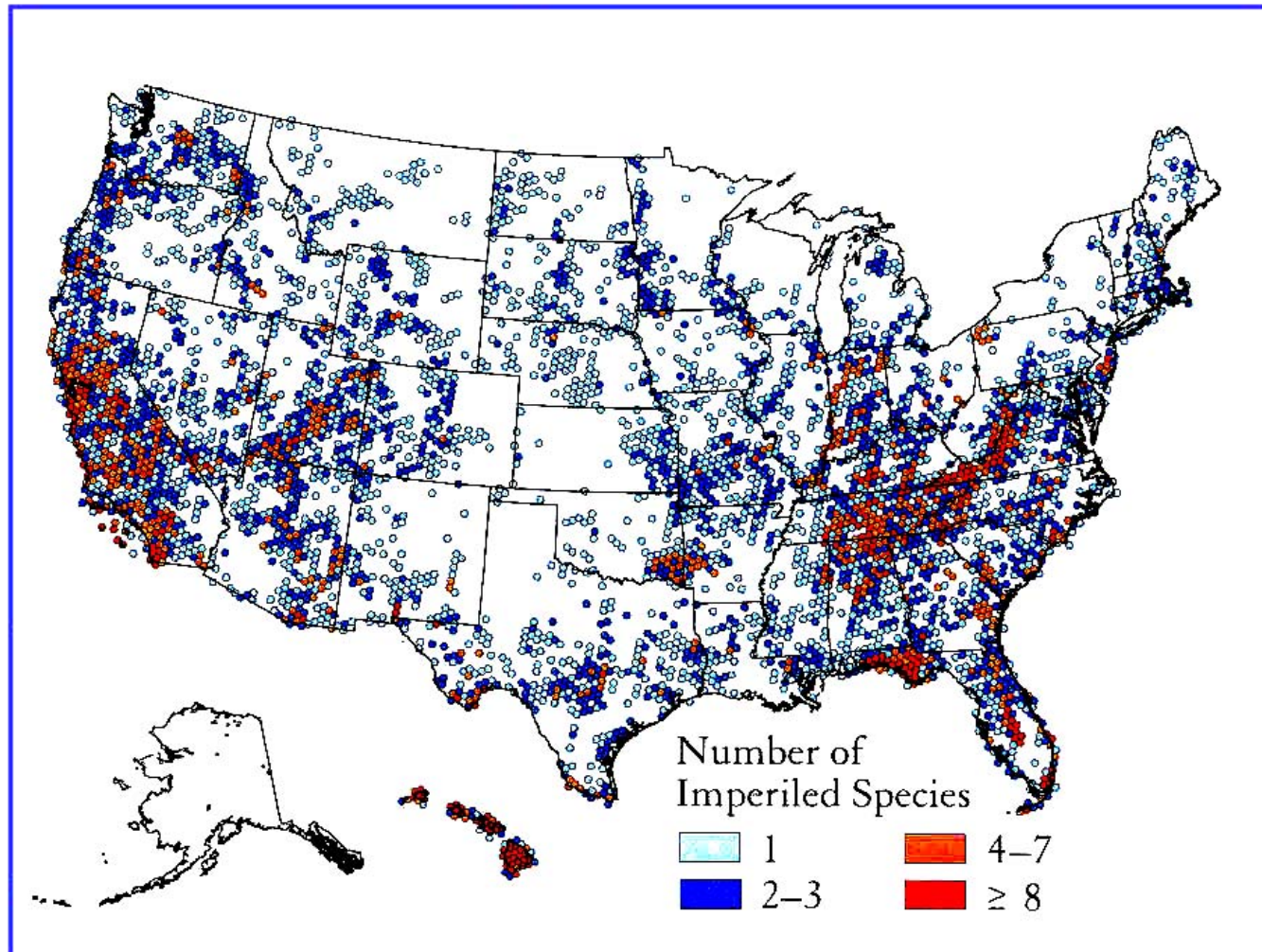




Status of Species



Species Protected Under the ESA



In the preamble to the Endangered Species Act...

SEC. 2.

(a) FINDINGS.-The Congress finds and declares that-

(1) various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation;

(2) other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of or threatened with extinction;

But Why Save Species?



In the preamble to the Endangered Species Act...

(3) these species of fish, wildlife, and plants are of **aesthetic, ecological, educational, historical, recreational, and scientific value** to the Nation and its people;





Albert Bierstadt, 1830-1902



Asher Brown Durand, 1796-1886



Winslow Homer, 1836-1910

How has our environment influenced our national culture?





John James Audubon, 1785-1851



Bev Doolittle, 1947 --

How do our species influenced us?





"Double Back" by Beverly Doolittle





Maybe not for everyone...





California red-legged frog (T)

What of our literature and performing arts?

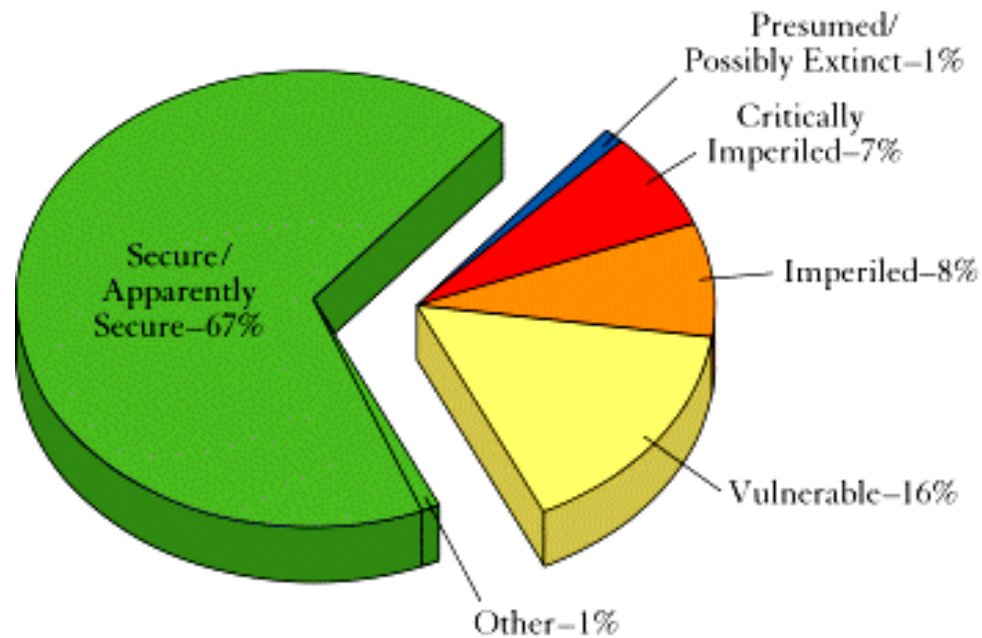
The Celebrated Jumping Frog of Calaveras County
— Jim Smiley's champion frog, Daniel Webster is
now *listed as threatened*.



National State Heritage Program Conservation Status Ranking System

- | | | |
|-----------|-----------------------------|--|
| G1 | Critically Imperiled | Includes ESA endangered and most threatened species |
| G2 | Imperiled | Some threatened and candidate species |
| G3 | Vulnerable | Includes some ESA candidate species |

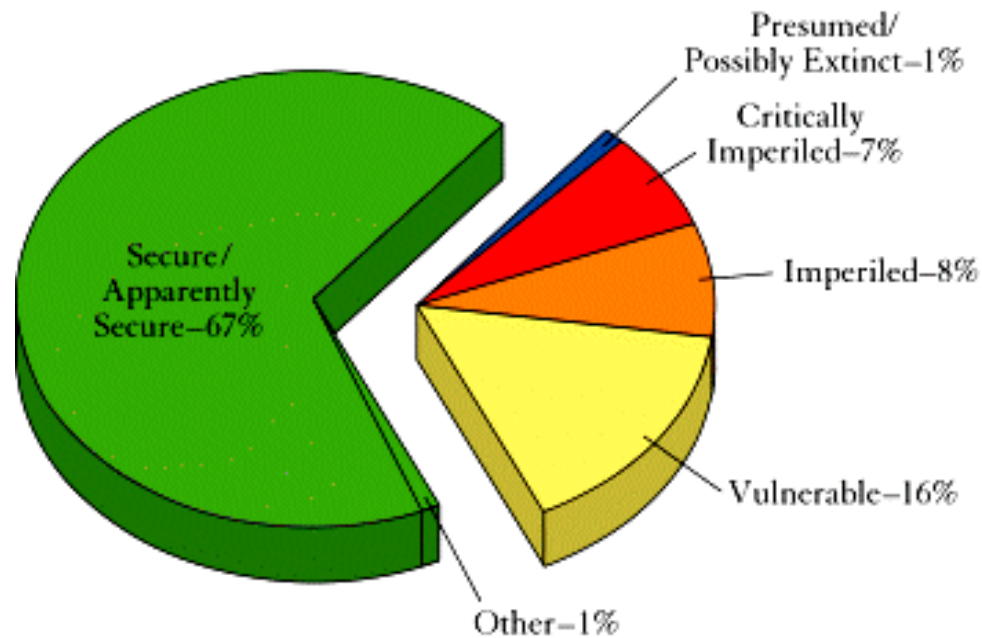




NatureServe, recently examined the conservation status of nearly 20,000 U.S. species.

Source: B. A. Stein, L. S. Kutner, and J. S. Adams, eds., *Precious Heritage: The Status of Biodiversity in the United States*, New York: Oxford University Press, 2000.





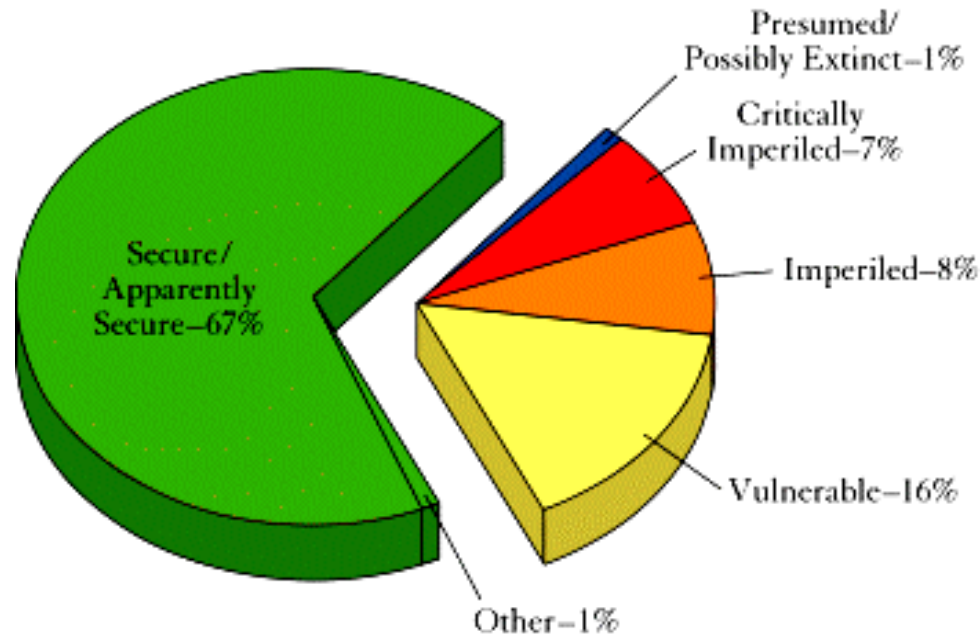
That analysis included all vertebrates, flowering plants, and certain major invertebrate groups such as freshwater mussels, crayfish and aquatic insects.



Source: B. A. Stein, L. S. Kutner, and J. S. Adams, eds., *Precious Heritage: The Status of Biodiversity in the United States*, New York: Oxford University Press, 2000.



Total U.S. Endangered -- 987
(388 animals, 599 plants)
Total U.S. Threatened -- 276 (129
animals, 147 plants)
Total U.S. Species -- 1263 (517
animals, 746 plants)



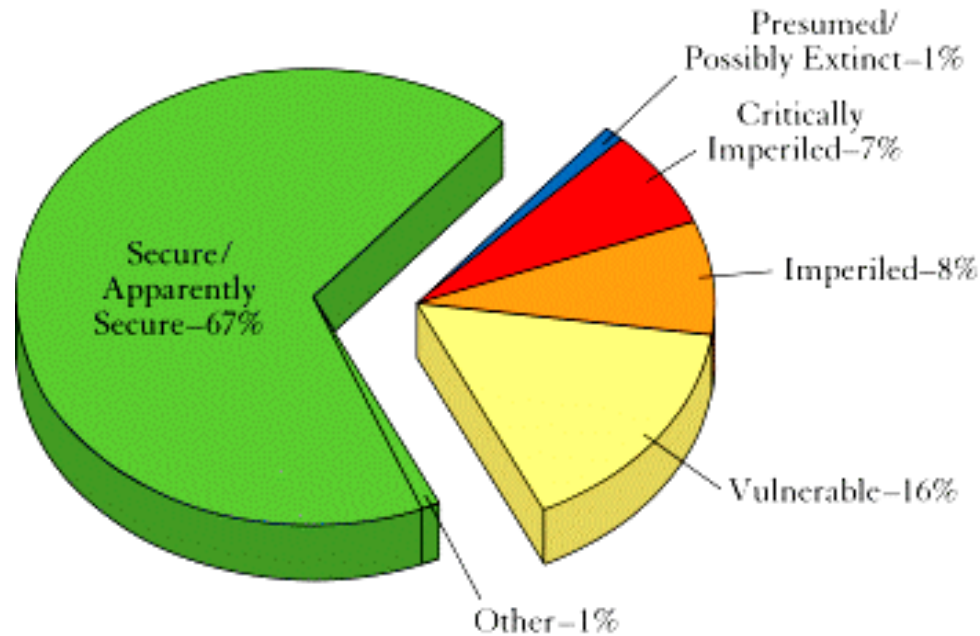
About 7,000 species, or 32% of those evaluated are vulnerable to significant population decline, critically imperiled, imperiled or thought to be extinct.



Source: B. A. Stein, L. S. Kutner, and J. S. Adams, eds., *Precious Heritage: The Status of Biodiversity in the United States*, New York: Oxford University Press, 2000.



Total U.S. Endangered -- 987
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The Endangered Species Act currently identifies less than 1,300 species as being endangered or threatened.

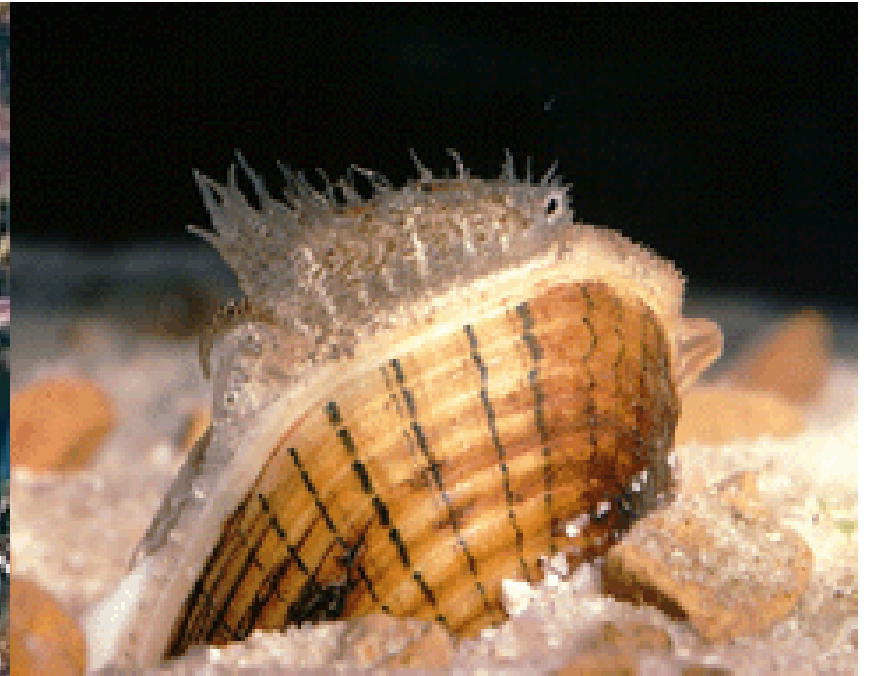
About 250 more species are candidates for listing.

Source: B. A. Stein, L. S. Kutner, and J. S. Adams, eds., *Precious Heritage: The Status of Biodiversity in the United States*, New York: Oxford University Press, 2000.



It could be argued that the
Endangered Species Act is
implemented in a very conservative
manner.





Fine-lined pocketbook (E)

Among our 292 freshwater mussel species, 67 percent are considered extinct, critically imperiled, imperiled, or vulnerable.

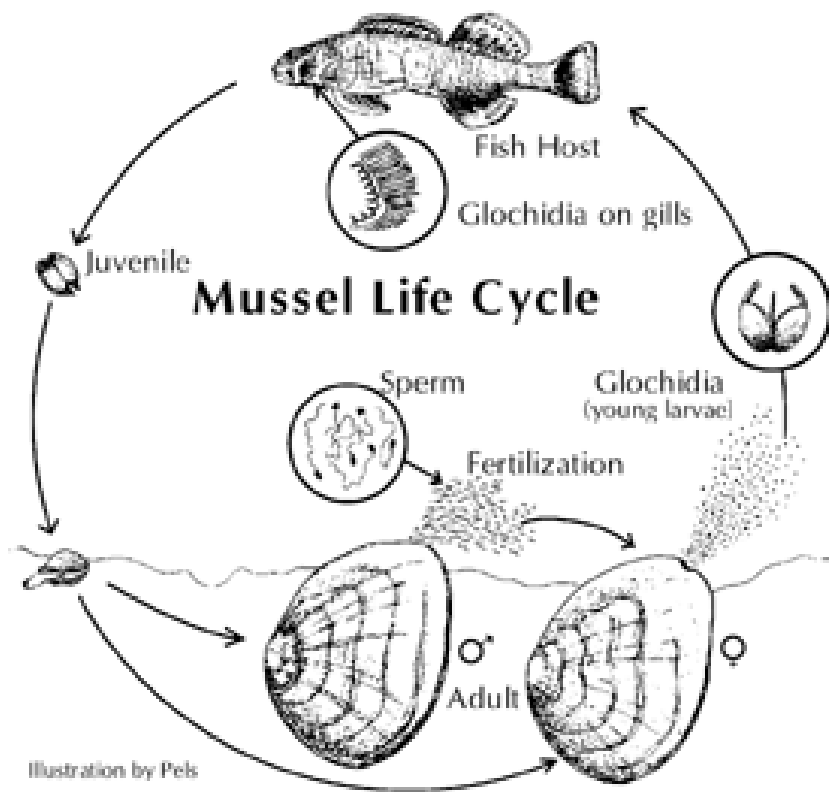




Fine-lined pocketbook (E)

The ESA identifies 72 species, or 24 percent as threatened or endangered.
What is so special about our mussels?





Life cycle of a freshwater mussel

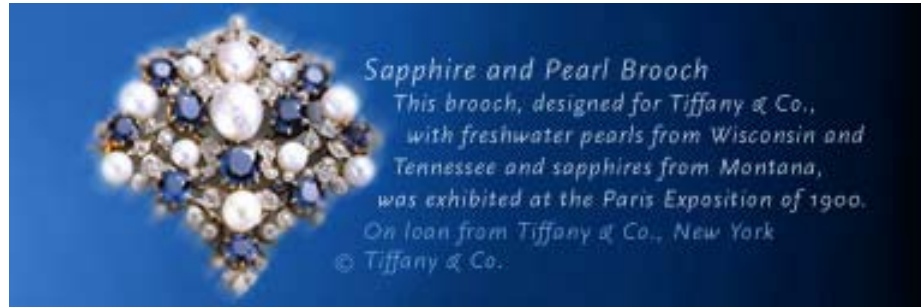
What's so special about our mussels?
An amazing life cycle...
and names!





What is so special about our mussels?

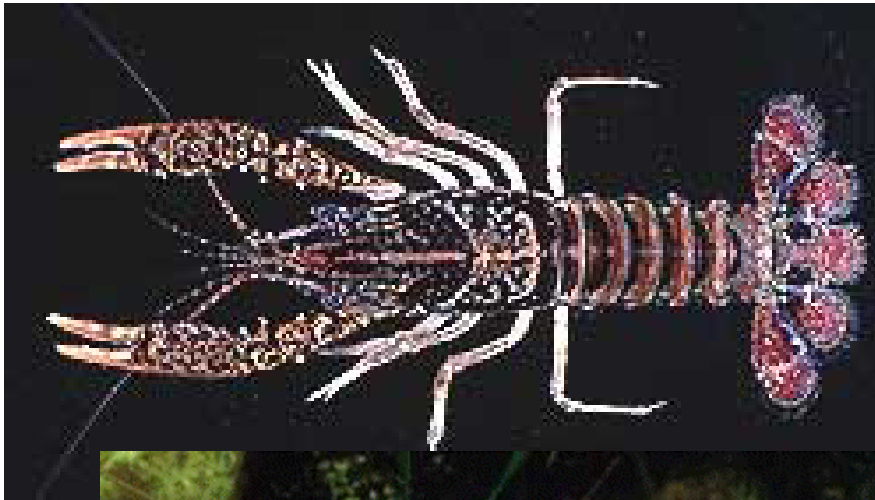




What is so special about our mussels?



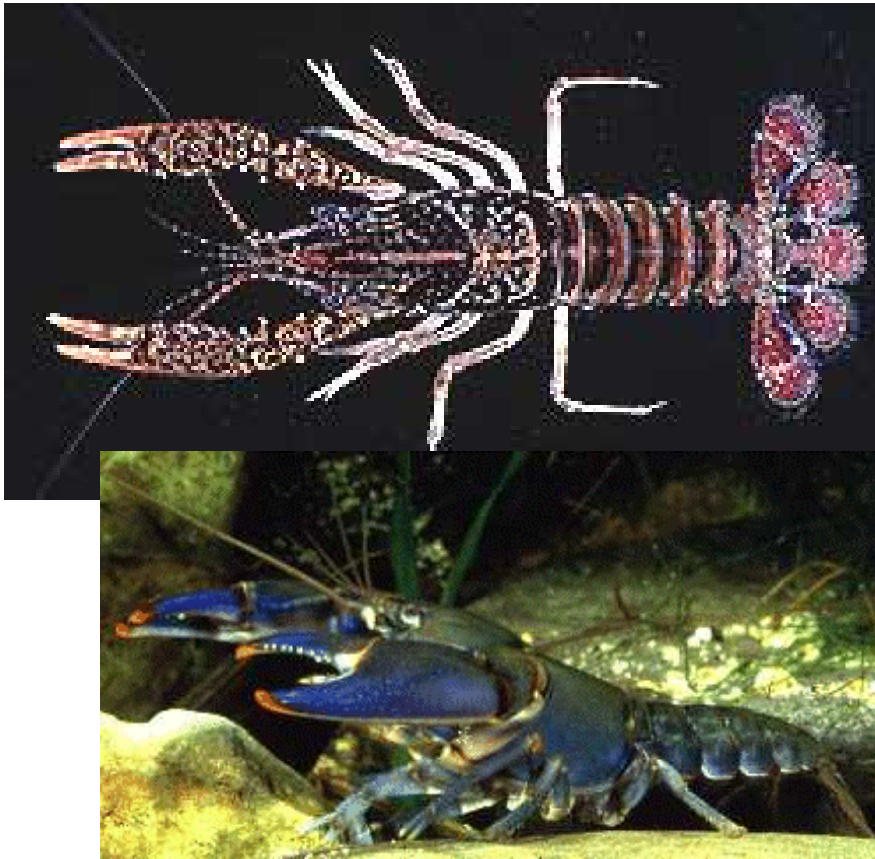
Various *Cambarus* spp.



The United States is home to 322 native crayfish, three-fifths of the world's known species. 96 percent occur no place else on earth.



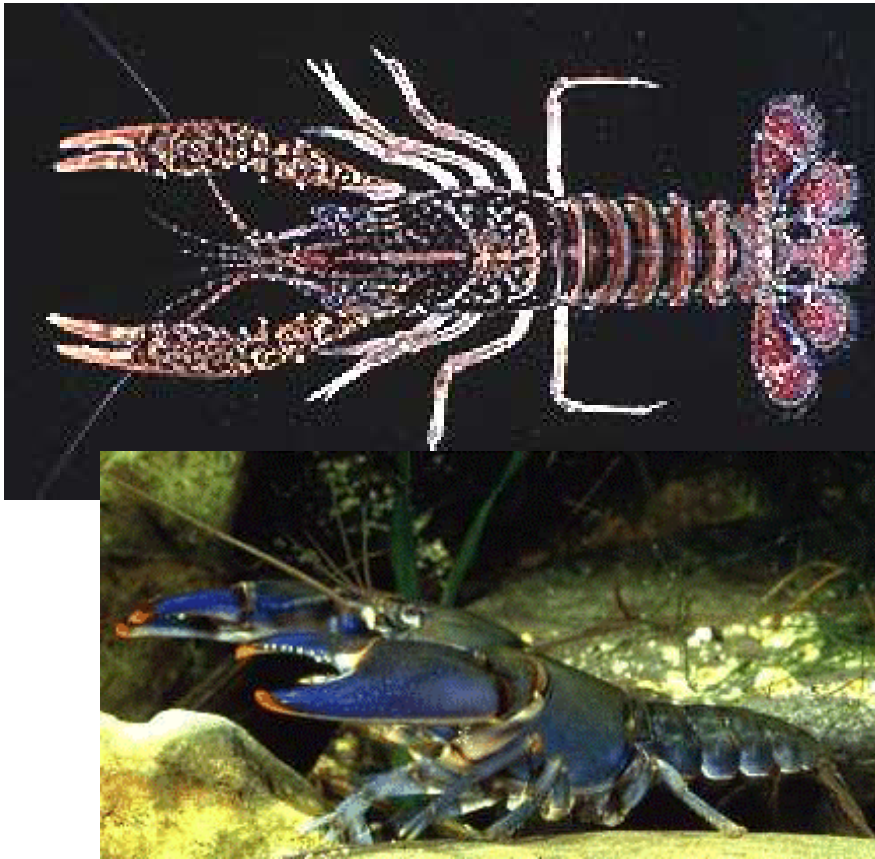
Various *Cambarus* spp.



51 percent of our crayfish are considered critically imperiled, imperiled, or vulnerable.



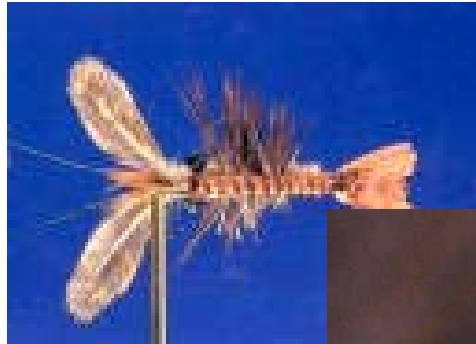
Various *Cambarus* spp.



The ESA identifies 21 species, or 6.5 percent as endangered or threatened.

What is so special about our crayfish?





Crayfish "fly"



Little green heron



Students monitoring stream organisms

What is so special about our crayfish?



Crawfish-Okra Gumbo

Ingredients:

½ cup vegetable oil

2 quarts fresh okra, sliced

1½ teaspoons salt

½ teaspoon black pepper

½ teaspoon red pepper

¼ cup parsley, chopped

½ cup onion tops, chopped

1 pound crawfish tails, cleaned

1½ quarts water

½ cup roux

1 large clove garlic, minced

1 large onion, chopped

2 fresh tomatoes, cut up, or ½ can tomato sauce

Procedure: Use heavy pot; heat oil. Add okra, salt, black and red pepper, garlic and onion to hot oil, and fry down for about 15 minutes on low heat. Stir very often to keep from sticking. Add tomatoes and cook for about 2 minutes. Add roux, onion tops, parsley, crawfish, and water. Let come to a boil and turn on low heat and let simmer for 1/2 hour.



Dragonfly larvae



Adult mayfly



Caddisfly larvae



Information from a national network of nearly 5,000 volunteer stream monitoring programs suggests that many local populations of aquatic insects are declining.

Are invertebrates a significant component of the list of threatened and endangered animals?

Oahu tree snail (E)



Cambarus spp.



Hine's emerald dragonfly (E)



516 animal species are currently listed within the United States under the Endangered Species Act as endangered or threatened.

200 of those species are invertebrates, accounting for nearly 39 percent of all listed animal species in the United States.



U.S. Fish and Wildlife Service Listed Invertebrate Species:

Freshwater mussels	=	72
Snails	=	50
Insects	=	45
Crustaceans	=	21
Arachnids	=	12
<hr/>		
Total	=	200



U.S. Fish and Wildlife Service Candidate Invertebrate Species:

Insects	=	44
Snails	=	26
Freshwater mussels	=	9
Crustaceans	=	9
Arachnids	=	1
<hr/>		
Total	=	89



More than 50 terrestrial invertebrates,
primarily insects, are protected under the
Endangered Species Act.

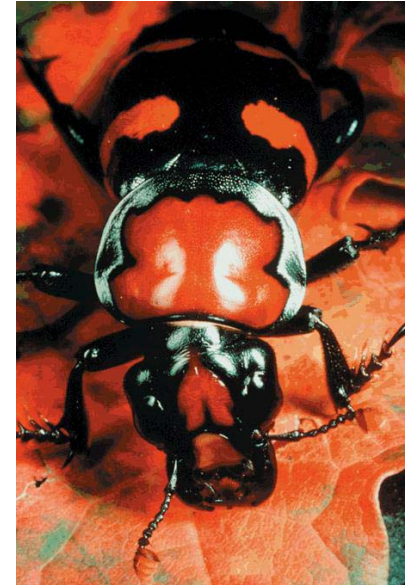
Butterflies and moths = 25

Beetles = 16

Other insects = 4

Arachnids = 12

Tiger beetle (E)



Bone Cave harvestman (E)



Karner blue (E)



What about vertebrate species?



Birds and Mammals



California condor (E)



Black-footed ferret (E)



Puerto Rican parrot (E)

The two groups that receive the most public and financial conservation attention are doing the best.

However...



Pacific
salmon



Greenback
cutthroat
trout (E)



Pallid
sturgeon
(E)



Ozark
cavefish
(E)



Of 799 native fish, 37 percent are considered critically imperiled, imperiled, or vulnerable by Heritage Program criteria.



Pacific
salmon



Greenback
cutthroat
trout (E)



Pallid
sturgeon
(E)



Ozark
cavefish
(E)

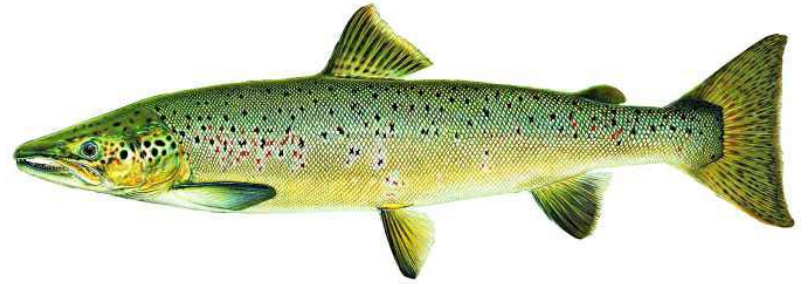


The ESA identifies 115 species, or 14 percent, as threatened or endangered.

What is so special about our fish?



Atlantic salmon



Coastal cutthroat trout



They are beautiful...
in trouble...

Bonneville cutthroat trout



(Which one is not
listed?)

Bull trout





Bluegill



Redbreasted Sunfish



Green Sunfish



Longear Sunfish



Crappie



Pumpkinseed



Bluespotted Sunfish



Orangespotted Sunfish



Largemouth Bass



Smallmouth



Striper



Bonytail Chub



Gilt Darter



Rainbow Darter



Greenside Darter



Holiday Darter

and amazingly diverse.





Barton Springs Salamander (E)

California red-legged frog (T)

Among 231 native species of amphibians, 40 percent are critically imperiled, imperiled, or vulnerable.

The ESA identifies 21 species, or 9 percent as endangered or threatened.





Barton Springs Salamander (E)



California red-legged frog (T)

**What is so special about our amphibians,
in particular salamanders?**



Blotched newt



Shenandoah salamander (E)



Hellbender

Four of every ten salamander species known worldwide occur in the United States, more than any other country.





Hellbender

The Hellbender salamander — the largest in North America — is declining in Arkansas and Missouri.



Desert tortoise (T)



Cagle's map turtle



River cooters

The 55 species of turtles native to the U.S. are approximately 20 percent of the world's total.

Twenty five species, or 45 percent are in need of conservation action.



Desert tortoise (T)



Cagle's map turtle



River cooters

Only 6 terrestrial
turtle species, or just
over 10 percent have
ESA protection.



Desert tortoise (T)



Cagle's map turtle



River cooters

What is so special about our freshwater turtles?

Last year, seven million were exported, primarily to Asia for food, and for the international pet trade.

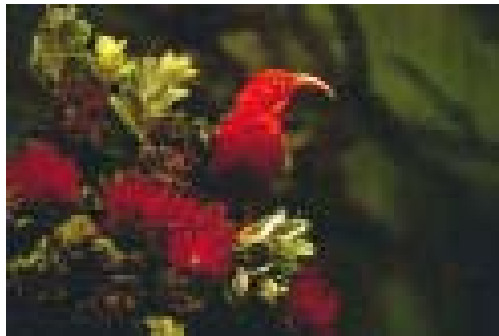




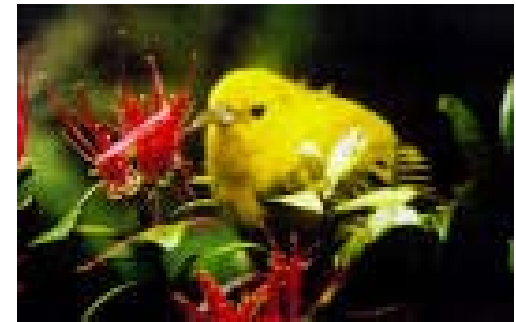
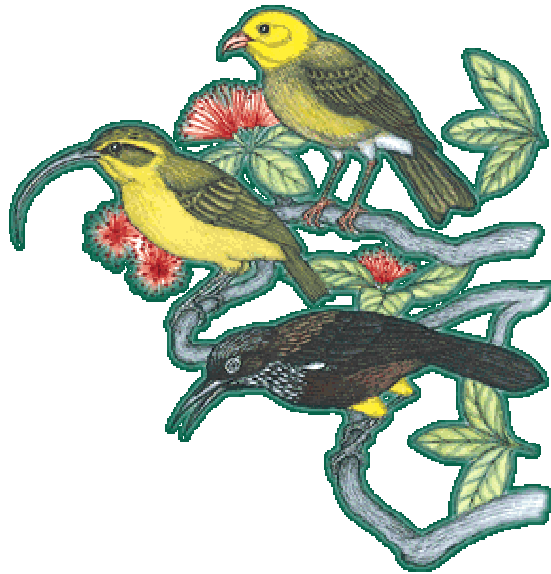
More than one quarter
of U.S. bird populations
are declining or in
danger of declining.

Other native birds
are balancing on
the edge of
extinction.





Hawaiian Honeycreeper

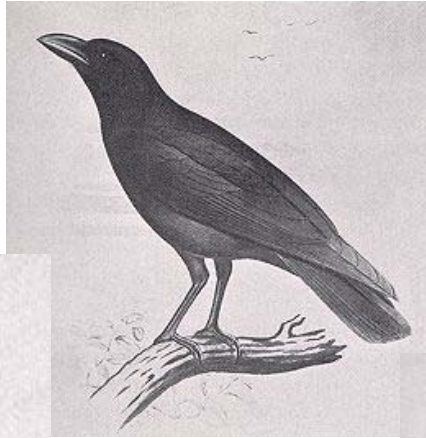


Hawaiian Finch

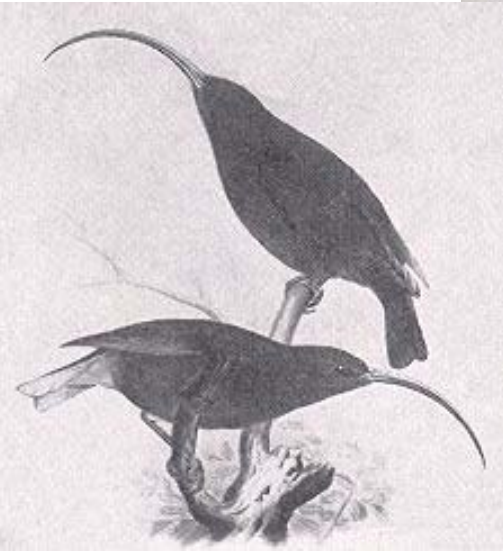
Of the 71 birds native to Hawaii, 26 have vanished. Of the 45 remaining species, 31 are listed as endangered or threatened under the Endangered Species Act.



'alala, Hawaiian Crow (E)



'io, Hawaiian Hawk (E)



Kauai Akialoa (E)



ae'o, Hawaiian Stilt (E)

Endangered Means There's Still Time





67% NatureServe
24% ESA



45% NatureServe
1% ESA



51% NatureServe
6.5% ESA



40% NatureServe
9% ESA

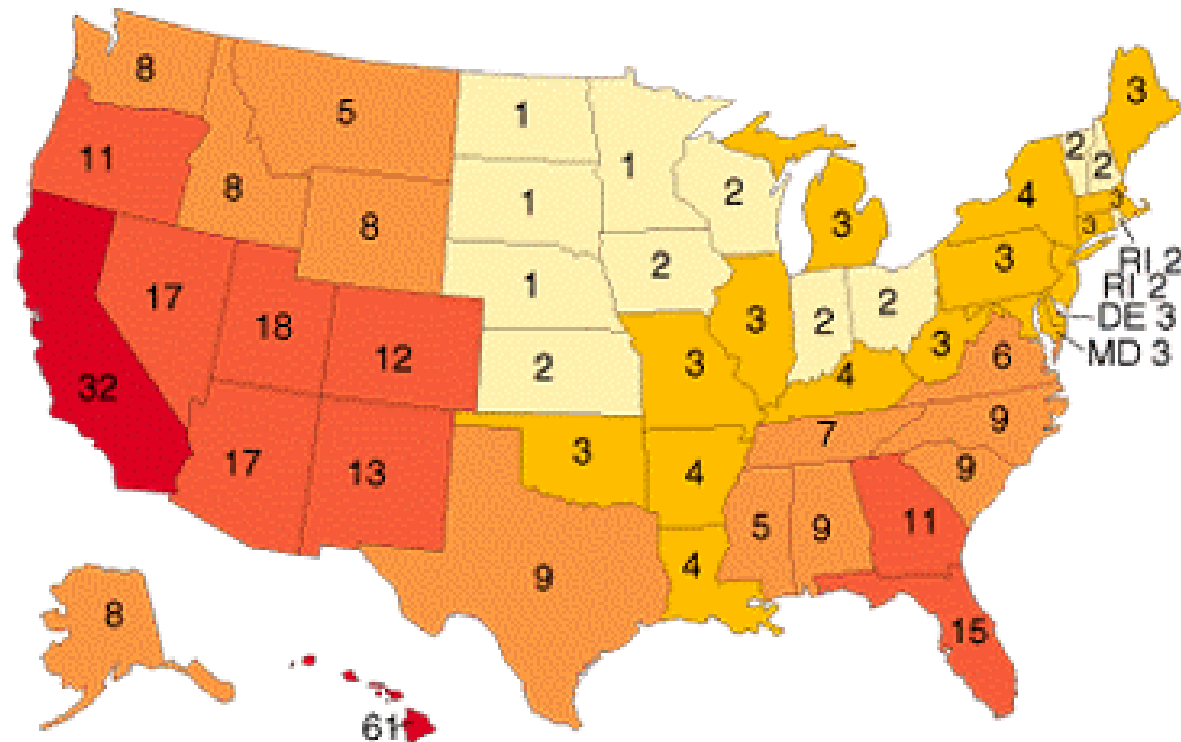


37% NatureServe
14% ESA

Most imperiled?

Are we forgetting something?



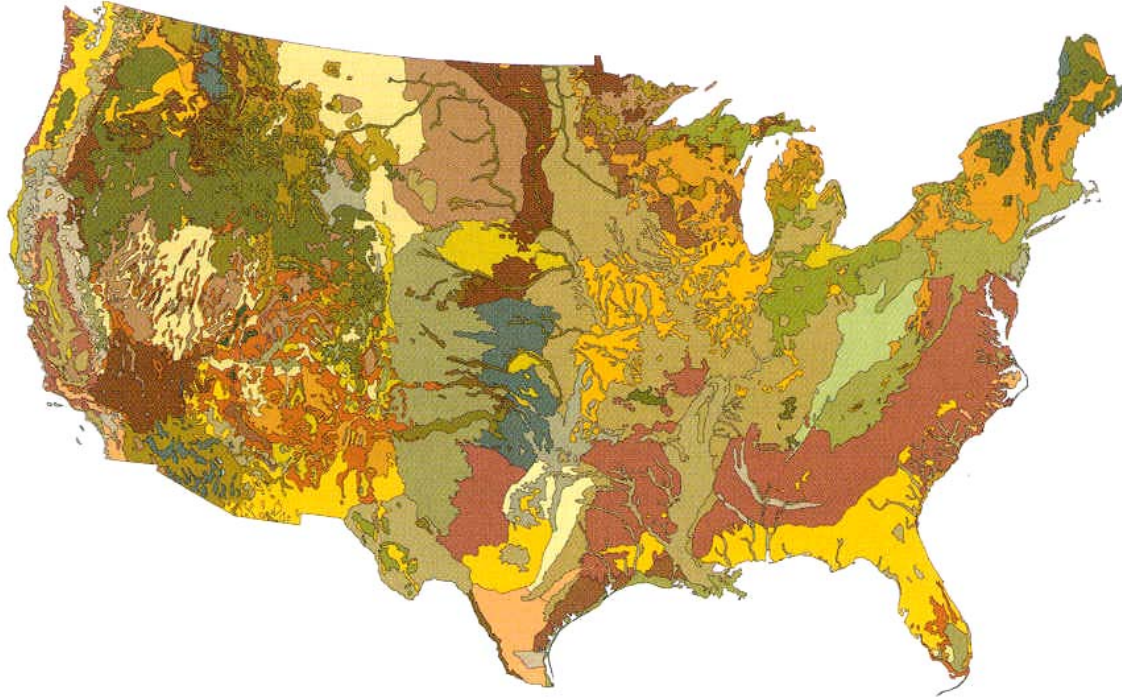


PERCENT OF NATIVE PLANT SPECIES AT RISK

LESS THAN 2.5% 5 TO 9.9% 20% OR MORE
 2.5 TO 4.9% 10 TO 19.9%

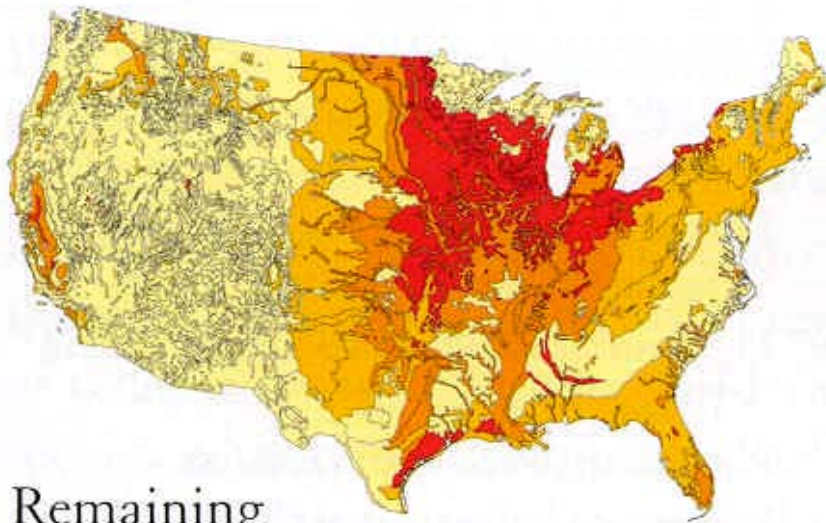
25% of native plants, a sobering 5,090 species, are critically imperiled, imperiled, or vulnerable to significant population decline.





106 potential natural vegetation types have been identified that have been projected to persist in the absence of disturbance.

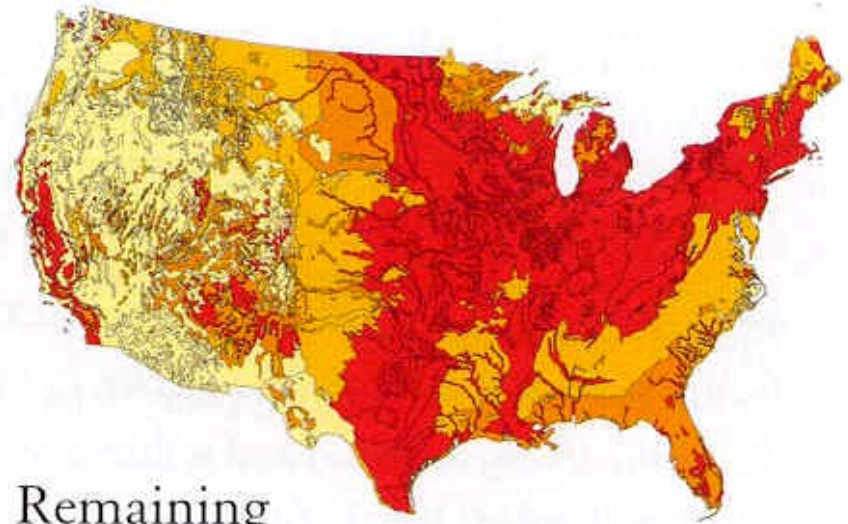




Remaining
Natural Vegetation



1967 (65%)



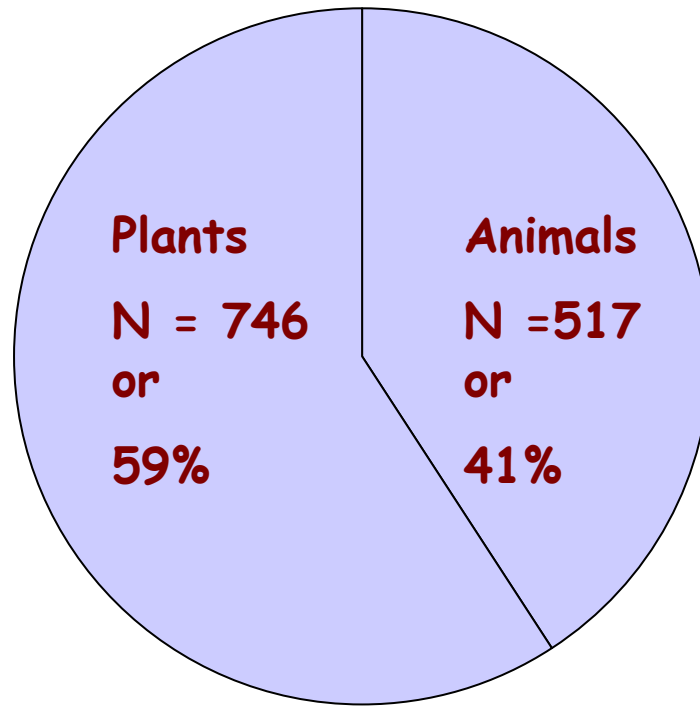
Remaining
Natural Vegetation



1992 (42%)

By 1992, more than **58%** of the United States no longer supported intact native plant communities.

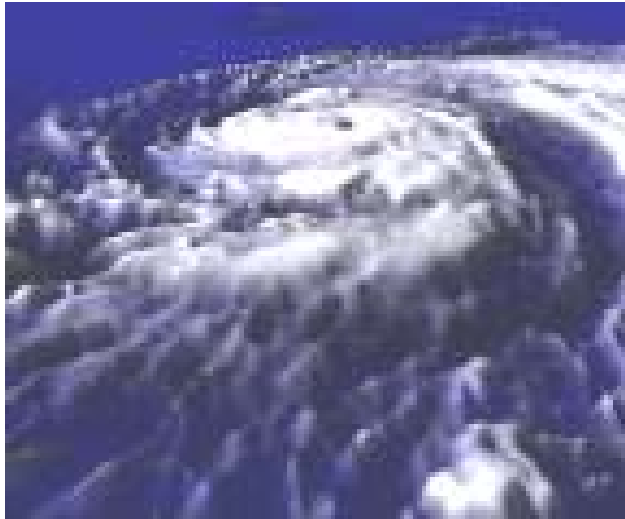




Plants and animals listed in the United States under the Endangered Species Act



Hawaii



The problem with paradise...

It's the epicenter of plant extinction in the United States.

- *Hibiscadelphus woodii*, two plants left.
- *Hibiscus clayi*, four plants left.
- *Kanaloa kahoolawensis*, two in the wild.
- *Pritchardia viscosa*, five trees in the wild.





Until recently, *Kokia cookei*, existed only as grafts on another endangered plant.

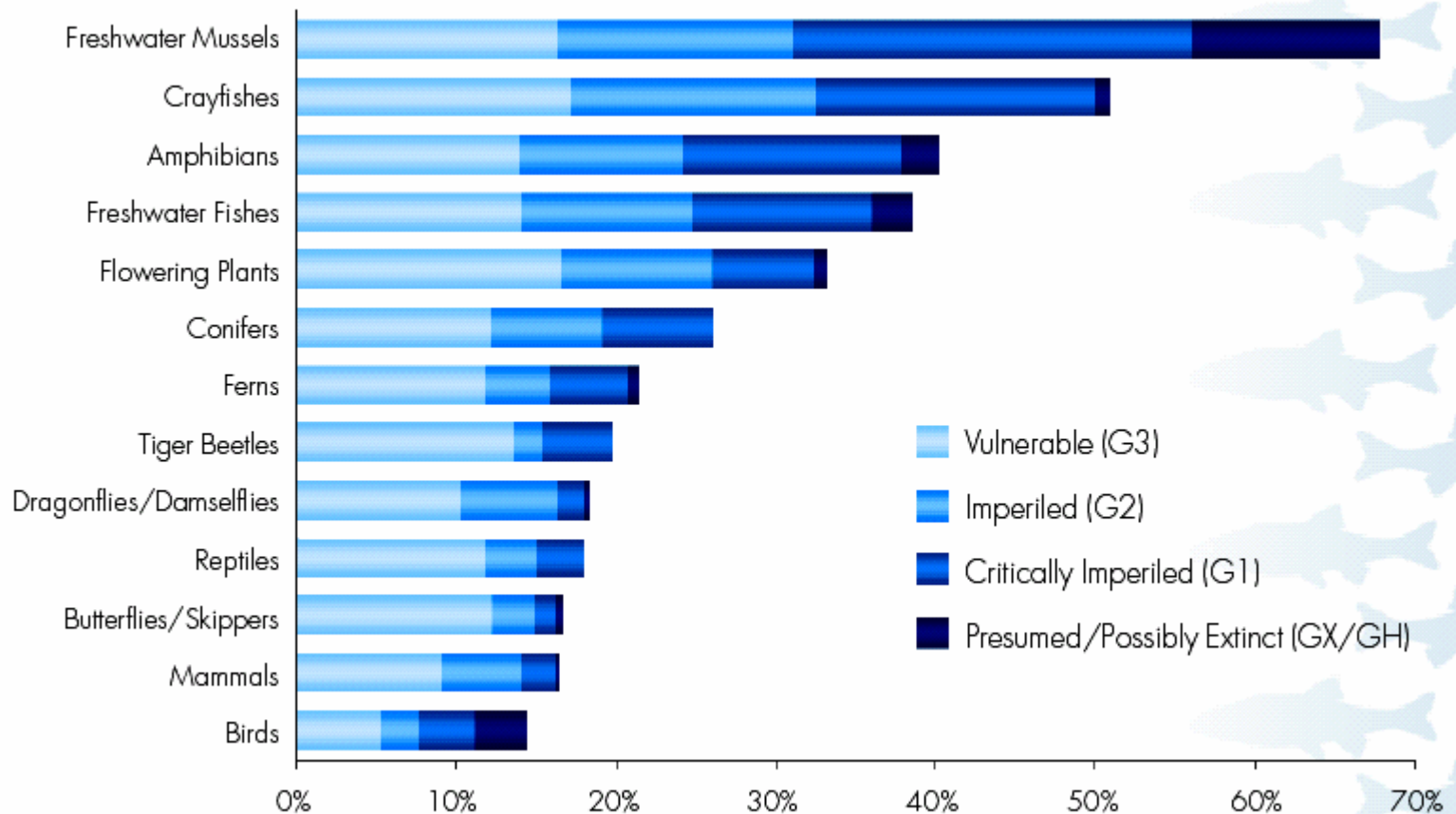




This mossy vine leaf maple is one of the types of trees often found covered with moss in the wet forests of the Pacific Northwest. Their moss is the basis for a multi-million dollar industry, much of it illegal.



Proportion of U.S. Species At Risk



The species groups that are proportionately the most imperiled; mussels, crayfishes, and amphibians, consist primarily of freshwater species.





Threats



"What's going on?"



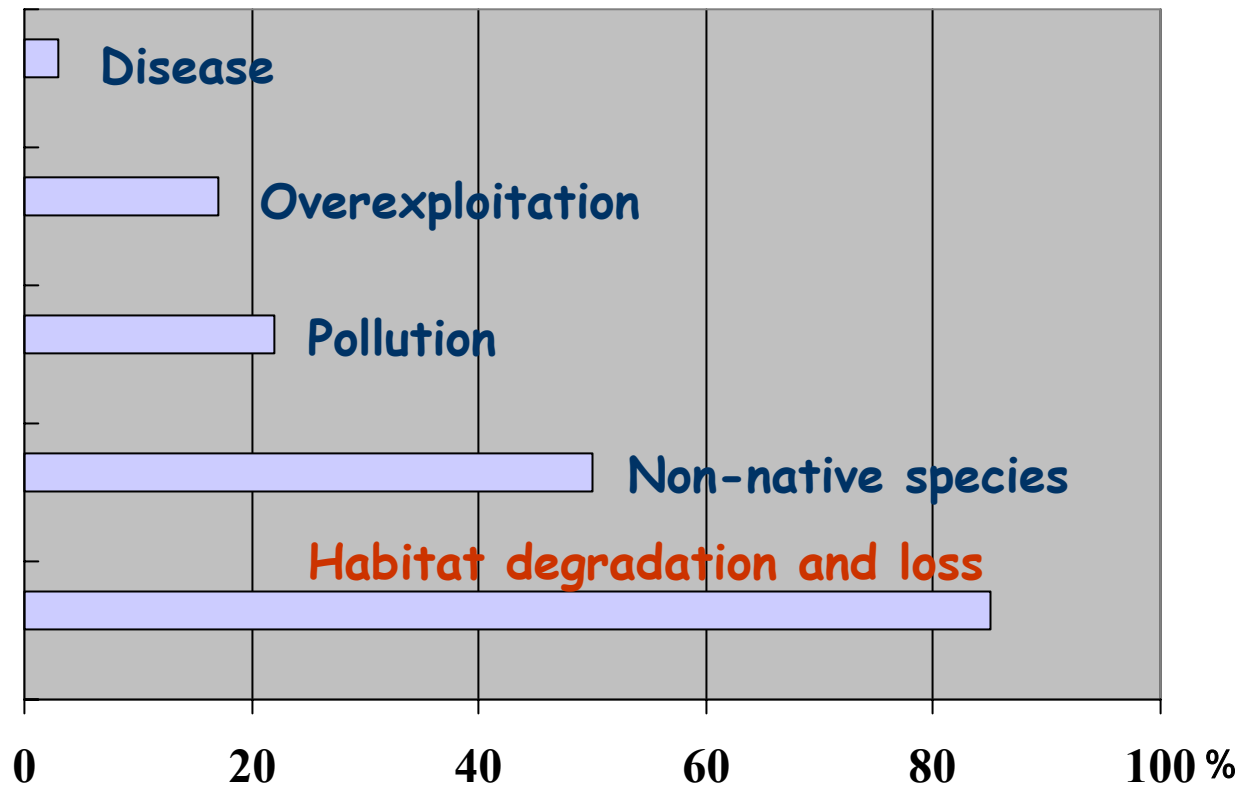
Hey! Didn't we just talk about
PLANTS?



The Five Factors for Listing a Species Under the Endangered Species Act

1. Overutilization for commercial, recreational, scientific, or educational purposes.
2. Disease or predation.
3. Inadequacy of existing regulatory mechanisms.
4. Other natural or manmade factors affecting a species' continued existence.
5. The present or threatened destruction, modification, or curtailment of habitat or range.

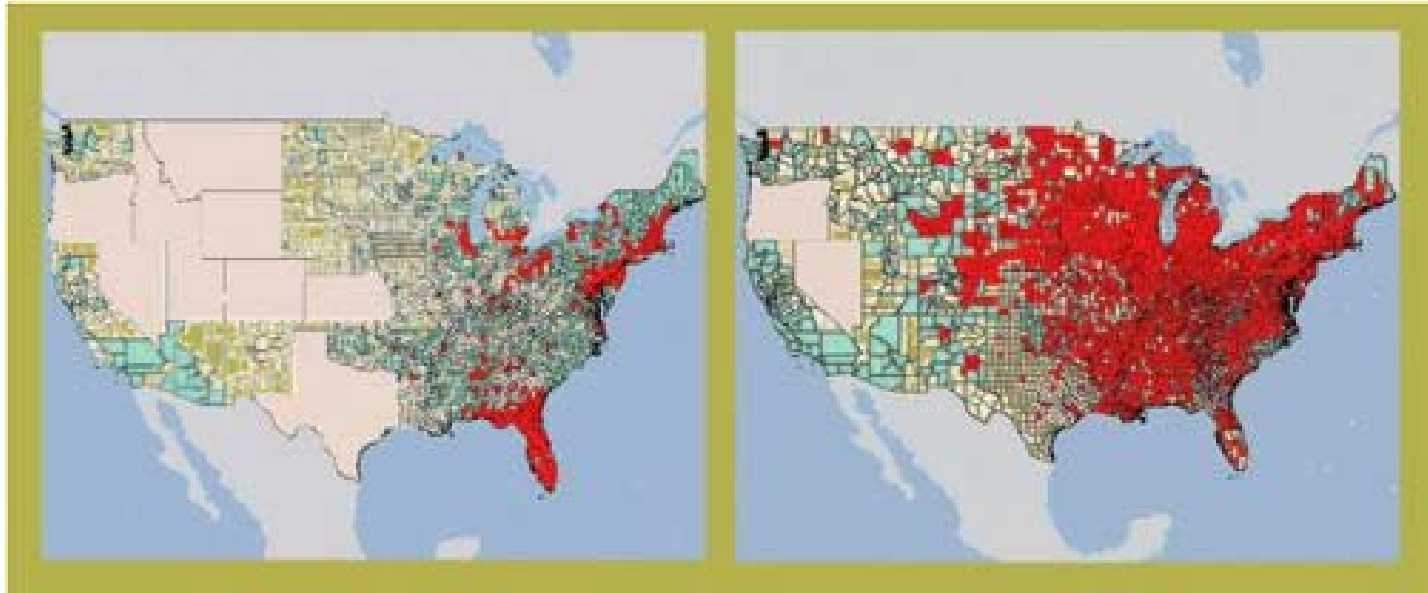




The leading **CAUSES** of species decline and imperilment.



Disease or Predation



2001

2002

In just one year West Nile virus swept rapidly through the U.S. bird population.



Disease or predation.

Sage-grouse were monitored in five sites in Alberta, Montana and Wyoming from March 2003 to September 2003.

Populations that had their first exposure to the West Nile virus in 2003, had a 25% decrease in late summer survival of females.

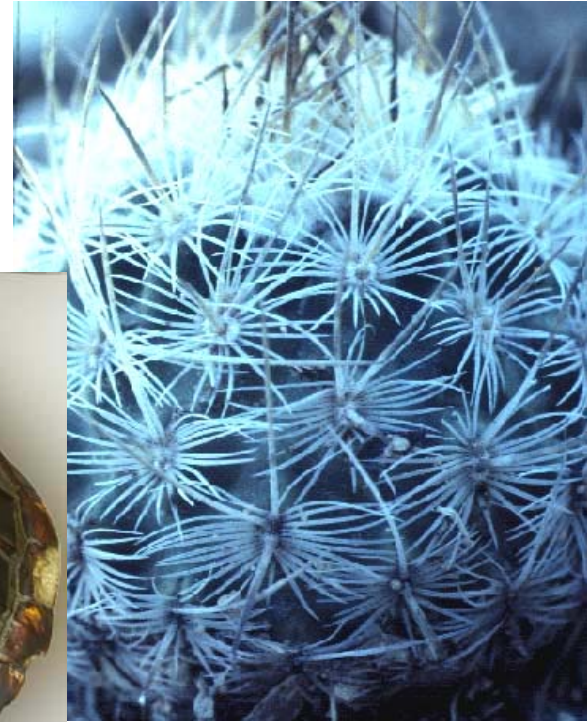


Overutilization



"Scientific" whaling

Hawksbill turtle (E)



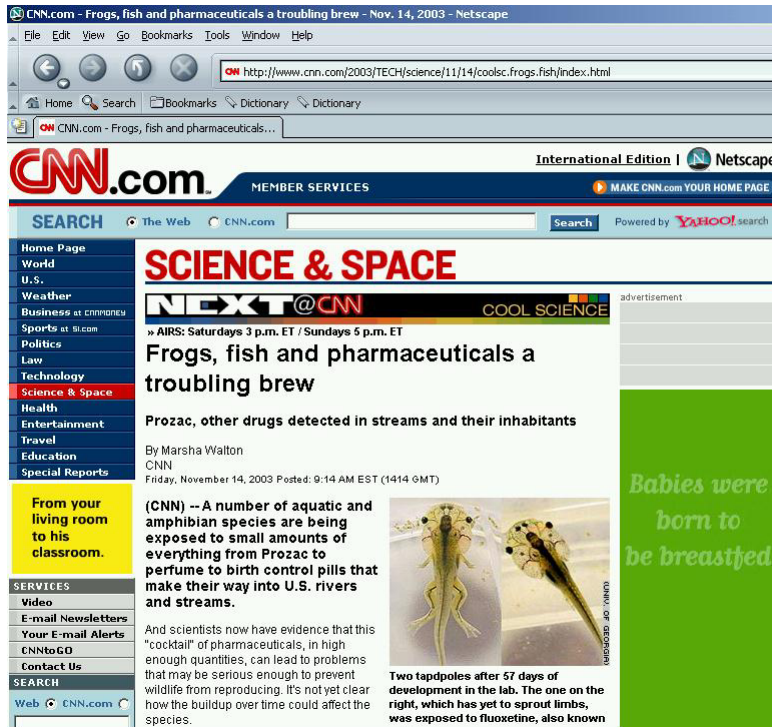
Lloyd's mariposa cactus (T)

Overutilization for commercial, recreational, scientific or educational purposes.



Pollution

"Frogs, fish and pharmaceuticals a troubling brew"



(CNN) – “A number of aquatic and amphibian species are being exposed to small amounts of everything from Prozac to perfume to birth control pills that make their way into U.S. rivers and streams.”
November 14, 2003



Pollution

“Frogs, fish and pharmaceuticals a troubling brew”



Two tadpoles after 57 days of development in the lab. The one on the right, which has yet to sprout limbs, was exposed to fluoxetine, also known as Prozac.

Stay Calm Everyone, There's Prozac in the Drinking Water (The Observer [UK], 8/8/2004)



Pollution

"Medicines, Caffeine And Antibacterial Soap Among Contaminants Found in American Streams"

The screenshot shows a Netscape browser window displaying a ScienceDaily article. The browser's address bar shows the URL: <http://www.sciencedaily.com/releases/2002/03/020313074342.htm>. The ScienceDaily logo is prominent at the top left, with the tagline "Your link to the latest research news". To the right of the logo is a VONAGE advertisement. Below the header is a navigation bar with links for "Latest News", "Browse Topics", "Encyclopedia", and "Science Shop". The main content area features a search bar and a list of news sections on the left. The article title, "Medicines, Caffeine And Antibacterial Soap Among Contaminants Found In American Streams", is displayed in a large, bold font. The article text begins with "A national survey of U.S. streams across 30 states has revealed a list of compounds that looks like a sample from our national medicine cabinet. Among them are the painkillers acetaminophen and ibuprofen, prescription medicines for cardiac disorders and hypertension, and female sex hormones used in birth control pills and hormone replacement therapy." A "What's Related" sidebar on the right lists other articles such as "Growing Evidence That Commonly Used Medicines May Delay Or Prevent Alzheimer's Disease".

Medicines, Caffeine And Antibacterial Soap Among Contaminants Found In American Streams - Netscape

File Edit View Go Bookmarks Tools Window Help

<http://www.sciencedaily.com/releases/2002/03/020313074342.htm>

Home Search Bookmarks Dictionary Dictionary

Medicines, Caffeine And Antibacterial Soap...

ScienceDaily
Your link to the latest research news

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> Social Sciences

Search articles with: in
and sort results by: ☒ relevance or ☐ date > [more options](#)

Source: [American Chemical Society](#)
Date: 2002-03-13

Medicines, Caffeine And Antibacterial Soap Among Contaminants Found In American Streams

A national survey of U.S. streams across 30 states has revealed a list of compounds that looks like a sample from our national medicine cabinet. Among them are the painkillers acetaminophen and ibuprofen, prescription medicines for cardiac disorders and hypertension, and female sex hormones used in birth control pills and hormone replacement therapy.

The study, done by the U.S. Geological Survey, will appear in the March 13 Web edition of the peer-reviewed journal Environmental Science & Technology, published by the American Chemical Society, the world's largest scientific society.

Although concentrations of most of the compounds were low, typically much less than one part per billion, previous research has shown that exposure to levels even lower than reported in this survey can illicit deleterious effects in aquatic species. Effects on humans, if any, have not been determined.

What's Related

Growing Evidence That Commonly Used Medicines May Delay Or Prevent Alzheimer's Disease

Morning Coffee Boosts Blood Pressure, Stress Hormones All Day

Postmenopausal Hormone Replacement Therapy Linked To Increased Risk For Certain

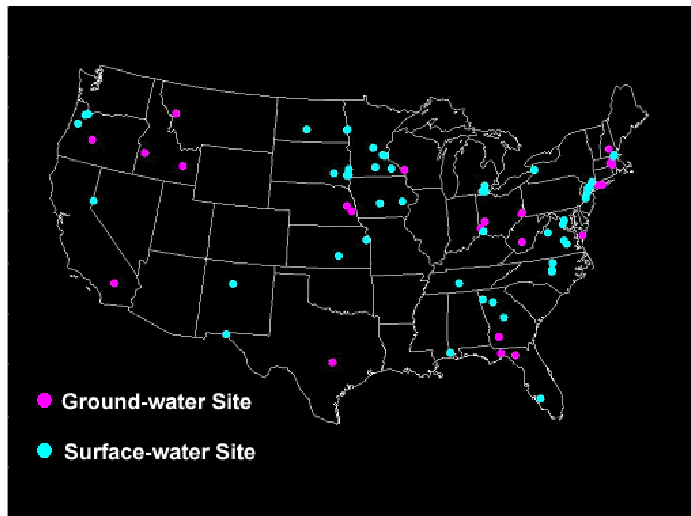
"A national survey of U.S. streams across 30 states has revealed a list of compounds that looks like a sample from our national medicine cabinet."

Source: American Chemical Society



Pollution

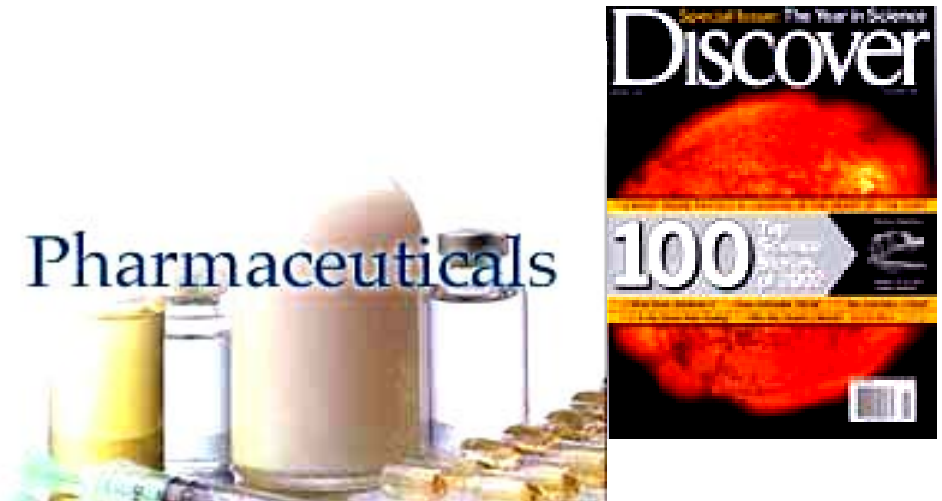
Up to 80 percent of drugs taken by humans and **domesticated animals** are excreted in their biologically active form.



Source: U.S. Geological Survey

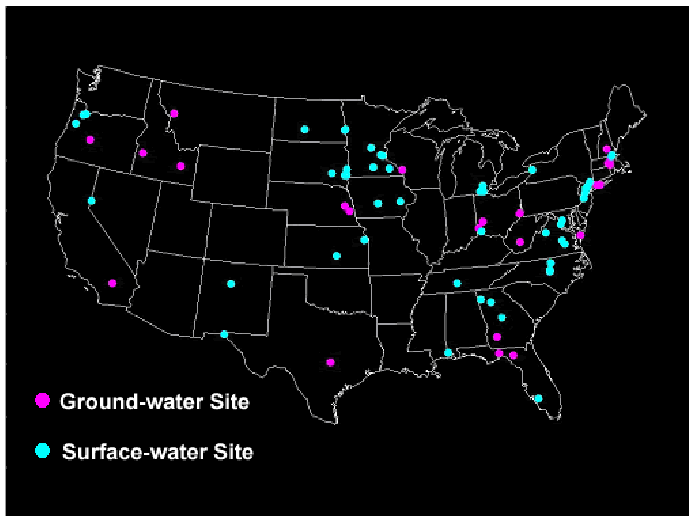
<http://toxics.usgs.gov/pubs/OFR-02-94/>

Pharmaceuticals



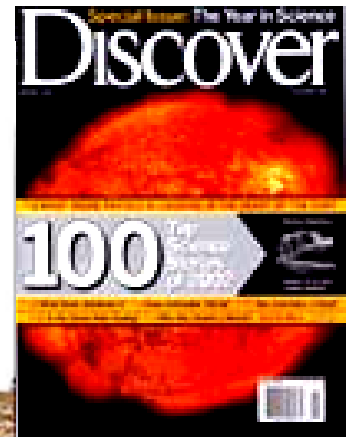
Pollution

The millions of doses of prescription drugs that Americans swallow annually to combat cancer, pain, depression and other ailments do not disappear harmlessly into our digestive systems.



Source: U.S. Geological Survey

Pharmaceuticals



<http://toxics.usgs.gov/pubs/OFR-02-94/>



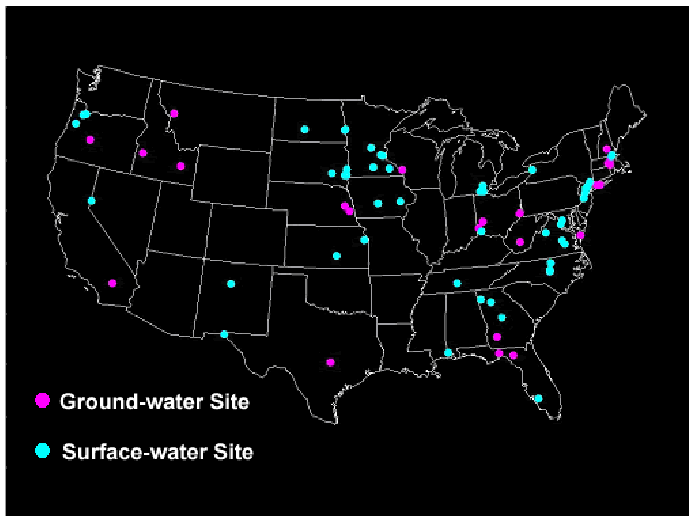
Pollution

Did we mention birth control?

"Fish Feel the Heat of Sex Hormones" --University of Florida study reported in the Los Angeles Times, 12/13/2003

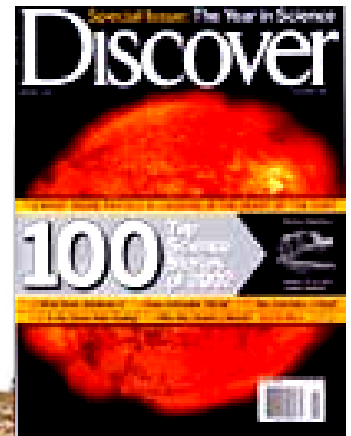
"Baylor Toxicologist Identifies Pharmaceutical Contaminants in Texas Waters, Fish"
--Baylor University, 10/27/2003

"Eating Lake Ontario Fish Linked to Shorter Menstrual Cycles; Consumption May Delay Pregnancy" --University at Buffalo, 12/6/1997



Source: U.S. Geological Survey

Pharmaceuticals



<http://toxics.usgs.gov/pubs/OFR-02-94/>



Pollution

Chemical contamination of water, air and food supplies has been documented for decades.

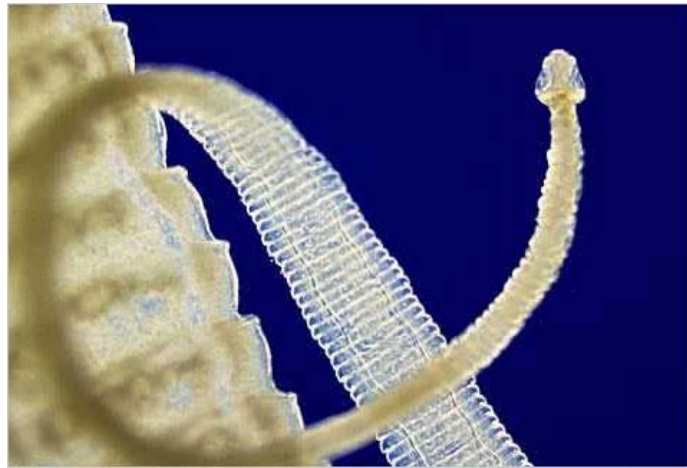
Scientists are beginning to uncover details about the pollution of a much more intimate site:

Our bodies.



Cyclic GMP

Produced by a tapeworm, cyclic GMP tells cells how to behave. When the tapeworm secretes this signal molecule, intestinal motility temporarily shuts down.



Hymenolepis diminuta: the rat tapeworm

Even the most lowly or least appealing species may have attributes that are important to our welfare.



Invasive Species

A word about “alien” or invasive species...

Zebra mussel



Kudzu



Alanthus altissimus,
Tree of Heaven



Brown tree snake

Or tree from Hell?

Not All Alien Invaders Are
From Outer Space



Invasive Species



1964



1998

4,600 acres of public wild lands succumb **each day** to invasive weeds. Much of this land will never be recovered.



Invasive Species



Wrong time, wrong place. Accidentally and on purpose, America is sowing seeds -- literal seeds -- of destruction.



Invasive Species



Invasive plants cost the U.S. economy about \$35.5 billion each year.



Invasive Species



Overall, Invasive species cost the U.S. economy about **\$140** billion each year.



Invasive Species



Earthworms are an invasive species in northern temperate forests. European in origin, they arrived in the US with settlers during the 1800's.



Invasive Species



Illegally released by pet owners who no longer wanted to take care of them... Burmese pythons are now breeding in the Everglades National Park.



Invasive Species

Burmese Python

Python molurus bivittatus



Size/weight

Length: 25' maximum

Weight: 200+ lbs

Reproduction

Eggs: up to 100/clutch
incubated & protected by
female

Diet

Wild: mammals, birds
& other reptiles
(of appropriate size)



What about habitat loss?

“The present or threatened destruction, modification, or curtailment of habitat or range.”

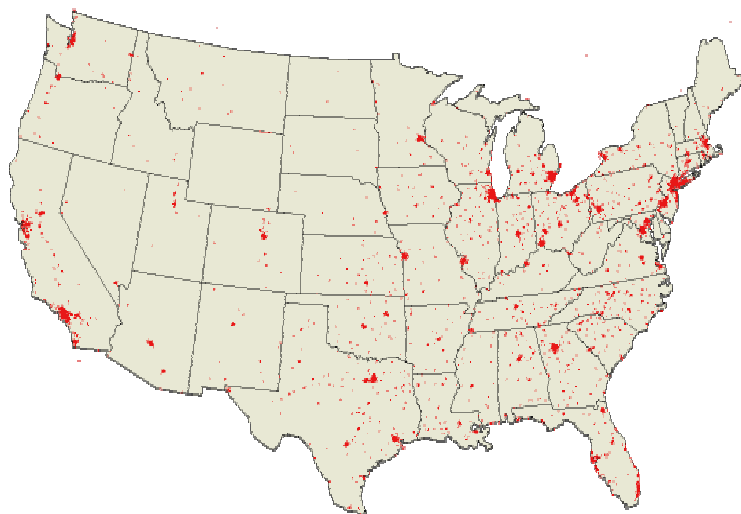


What nearly all imperiled plants and animals have in common is their struggle to survive in ever-expanding human-modified habitat.

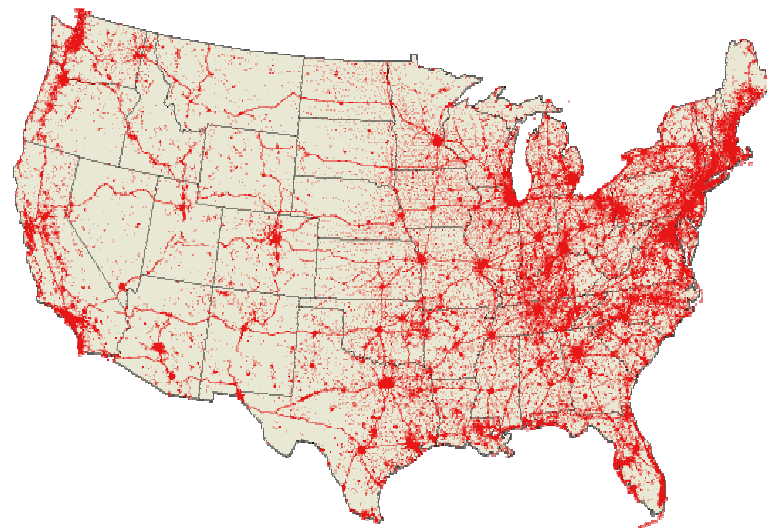


For wildlife **and**
for people, it is
not just about
quantity, but
quality as well.





1965




1995

Urban and Suburban Development

In the past, yards and gardens were tiny islands in the vast wilderness of the American continent. In such a setting, there was little need to worry about nature and our impacts upon it.





Today, many
natural areas within
the United States
have become islands in
a sea of disturbance.

Once, our communities were discrete settlements.

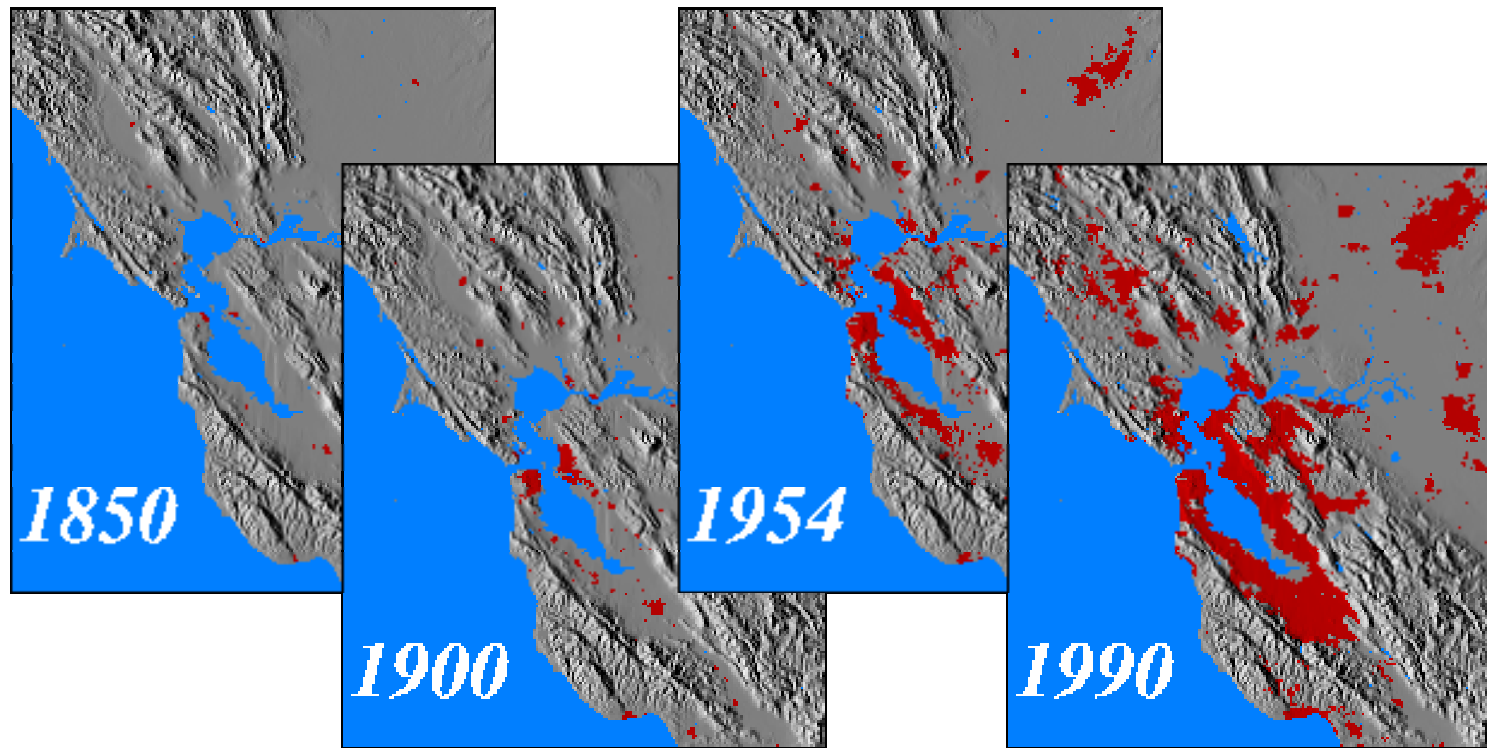
The problem is the
isolation didn't last.



Los Angeles Basin: 1908 to 2002

At varying rates and scales, this scene is being repeated across much of the country.

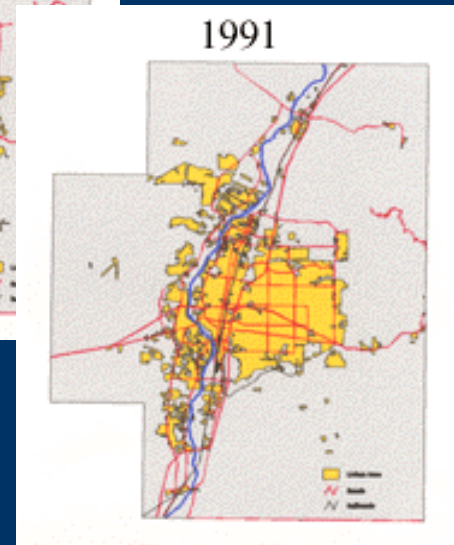
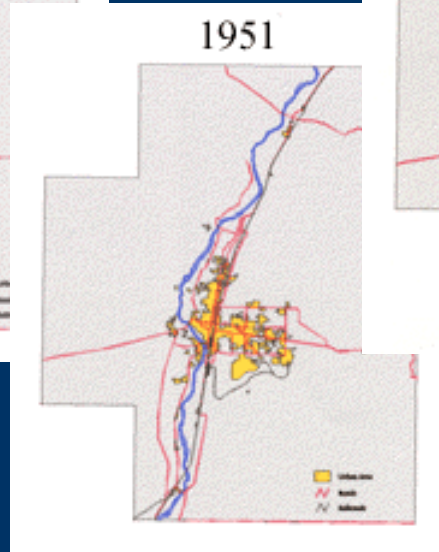




San Francisco CA: 1792-1992

(Image from T.A. Foresman, *Urban Ecosystems*, 1997)

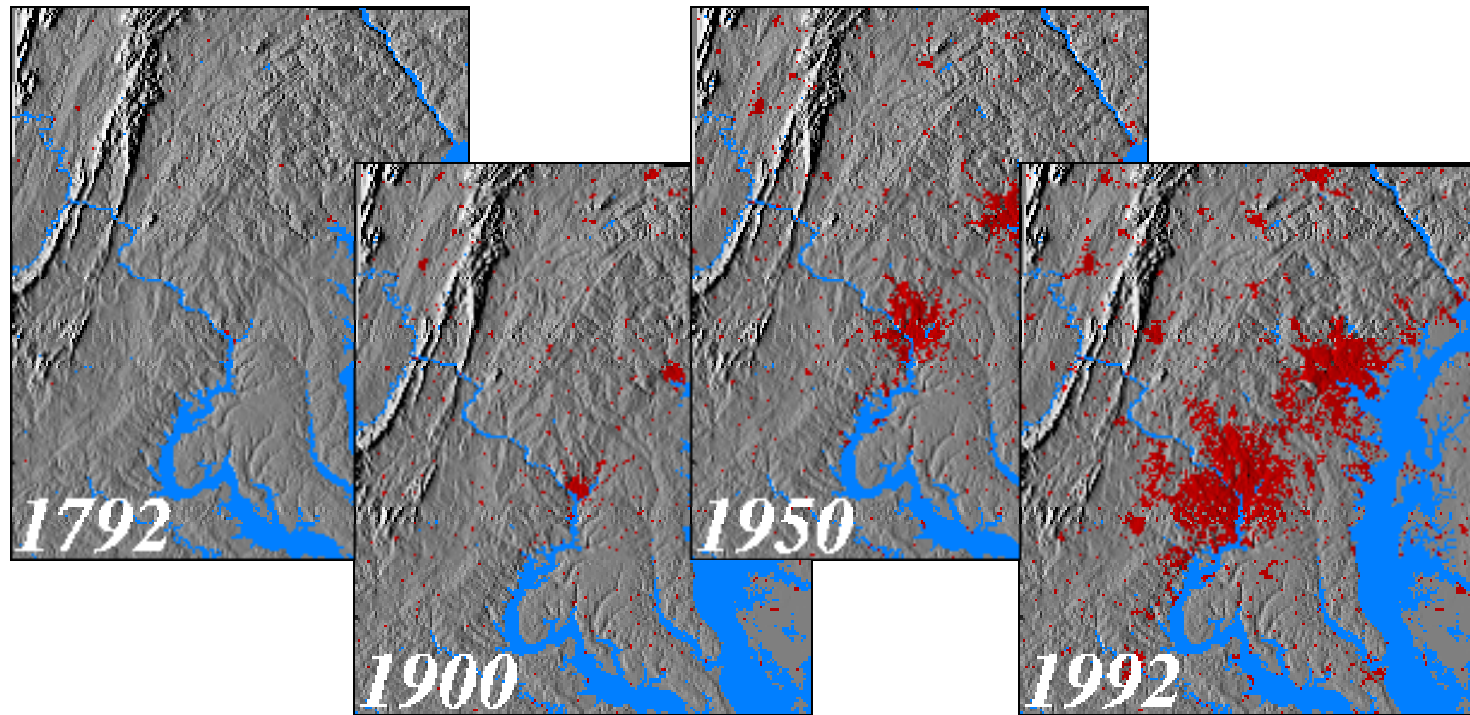




Albuquerque NM: 1935-1991

(Images from USGS)





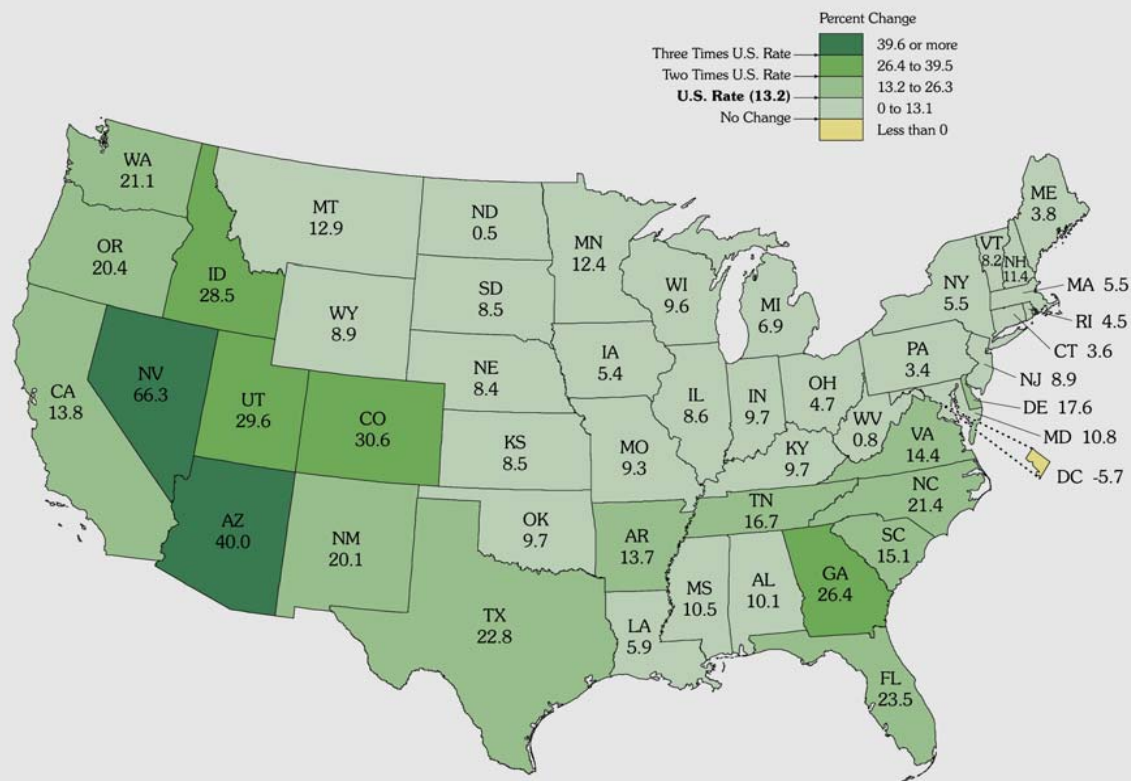
Baltimore-Washington D.C. Corridor: 1792-1992

(Image from T.A. Foresman, *Urban Ecosystems*, 1997)



Demographic Changes: Population Has Grown Fastest in the West, Particularly in the “Public Land States”

Percent Change in Resident Population for the 50 States and the District of Columbia: 1990 to 2000



- Darker areas denote faster growth rates.

- Nevada (66%) and Arizona (40%) lead the nation.

- Intermountain states average about 30%.



Within the next 50 years the population of the United States is expected to grow by half, or about 130 million people.



As species' habitats are diminished or disappear altogether, what remains becomes even more important.

Not just for those that are endangered or threatened, but for all our species' well being and survival.



California condor (E)

- *Florida panther*
- *Wood stork*
- *Red-cockaded woodpecker*
- *Chapman rhododendron*
- *Florida scrub jay*
- *Eastern indigo snake*
- *Bald eagle*
- *American burying beetle*



The ultimate threat?



HE DIDN'T KNOW HOW TO APPRECIATE NATURE.

Does it matter?
Of course it does!



If we focus solely on the prospects of extinction, we miss an important point.

Species stop functioning as critical components of their ecosystems well before they completely disappear.

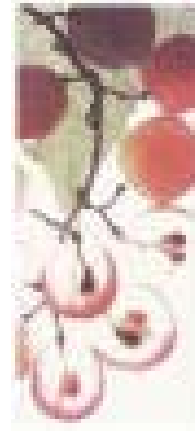
As we have learned, it is far simpler and less costly to conserve healthy populations rather than try to reconstruct them later.





Opportunities





(DSPA) or desmoteplase from vampire bats could help fight clotting in heart attack victims.

(BLADe) or bioluminescence activated destruction of cancer cells from fireflies has medical potential.

(GSPE) or grape seed proanthocyanidin extract helps heal wounds.

Black raspberries are a potential agent in the fight against colon cancer... the #2 killer in the United States.





What all species need is adequate food, water, and shelter.





Food for thought...





Who is losing what?



“Over the long haul of life on this planet, it is the ecologists, and not the bookkeepers of business, who are the ultimate accountants.”

-- Stuart Udall, former Secretary of the Department of the Interior



“Plans to protect air and water,
wilderness and wildlife are in
fact plans to protect man.”

-- Stuart Udall, former Secretary of
the Department of the Interior





In Nature there is no such thing as a "free lunch."

Everything comes from somewhere and is connected to something else.

We will always have to pay the piper.

Keep in mind, the piper charges interest.





Conclusion(s)



It's not over till it's over...

How can we better communicate?

Can we improve our conservation vision?

How can other FWS programs and those of other agencies help you to help fish and wildlife?

How can we work together to educate others?

What can we do together?



Least Bell's vireo (E)



"To keep every cog and wheel
is the first precaution of
intelligent tinkering."

Aldo Leopold

The first photograph of the Earth and
moon from Mars by NASA's Mars
Global Surveyor (May 8, 2003).



Thank You!



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Extended Value

